

THE
ANNALS
of THE HITOTSUBASHI ACADEMY

Vol. IV No. 2

April 1954

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HITOTSUBASHI UNIVERSITY
Kunitachi, Tokyo
Japan

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THE ANNALS are published in April and October of each year. Copies are distributed to academic institutions in Japan and abroad, in exchange for publications of a similar nature. For individuals, the subscription price is \$2.00 per annum, single copies \$1.50. Communications to the Academy should be addressed to the Secretary of the Hitotsubashi Academy, Hitotsubashi University, Kunitachi, Tokyo.

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Printed for the Academy by
The Dobunkan Company, Limited
Jimbocho, Kanda, Tokyo

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THE INCOME GROWTH AND THE RATE OF SAVING IN JAPAN: A BRIEF SURVEY OF RECENT ESTIMATES BY HITOTSUBASHI-GROUP¹

By YUZO YAMADA

Professor of Economics

1. How High?

At the outset I would like to call the reader's attention to Mr. Colin Clark's figures on the subject. In his work, *The Conditions of Economic Progress*, 2nd ed., 1951, he pointed out the very high rates of income growth in Japan, based upon the following estimate.

Table I. Mr. Colin Clark's Estimate of Real National
Income and its Rate of Growth in Japan

Period	Real income (in million I. U.)	Rate of growth per year
1887 to 1897	1.45 to 1.69	1.54
1897 to 1908	1.69 to 2.53	3.74
1908 to 1914-22	2.53 to 4.03	4.77
1914-22 to 1918-27	4.03 to 6.09	9.60
1918-27 to 1923-32	6.09 to 8.14	5.97
1923-32 to 1928-37	8.14 to 10.63	5.48
1928-37 to 1933-42	10.63 to 13.84	5.42

Table rearranged by Mataji Umemura from the figures given in Colin Clark, *op. cit.*, p. 136.

¹ This article is a revision of a paper presented to the International Association for Research in Income and Wealth, at the Meeting in Castelgandolfo near Rome, on 1-6 September 1953. I am indebted to Professor Shigeto Tsuru and other members of the Institute of Economic Research of the Hitotsubashi University for arranging my original paper. As an appendix, "Comment on Mr. Harry Oshima's Discussion" has been added.

The rate of growth per year, according to the above table, is within the range between 3.7% and 9.6% except the low rate in the first period. The average rate of the whole period may be more than 5%, and since 1914 nearly 7%. It is clear that such a rate is very high compared with the rates in countries in Europe and America. Mr. Colin Clark indicates also the high proportion of savings to national income in Japan, as shown in the following table.

Table II. Mr. Colin Clark's Estimate of Saving in Japan

Period	Savings (1) (million I. U.)	Income (2) (million I. U.)	Proportion (1) (2)
1913-19	1.8	3.3	54.5
1919-24	2.8	5.7	42.1
1924-30	3.0	8.0	37.5
1938	3.86	14.5	26.6
1939	4.21	14.8	28.5
1913-39	3.1	9.2	33.7

Table rearranged by Masakichi Ito from the data given in Colin Clark, *op. cit.*, p. 506.

The rapid economic progress in Japan since the Meiji era is generally convincing, and is correct. But the estimate of the rate of progress is a subject for consideration, and the figures given by Mr. Colin Clark also should be reexamined closely.

The statistical data used by Mr. Colin Clark in his work are very limited, partly because of language restrictions and partly to the lack of good data available at that time. The purpose of the present paper is to give a brief survey of recent estimates attempted by the Hitotsubashi-group regarding the economic growth and savings in Japan.

2. List of Recent Main Works

Here I will not attempt to describe the history of Japanese income statistics. It may be enough to indicate some recent main works, beginning with the present writer's own book:

- (1) Yuzo Yamada, *Nihon Kokumin Shotoku Suikei Shiryo (The Data Book of National Income Estimates in Japan)*, Tokyo 1951.

The author (the present writer himself) tried to compile various past estimates and to give his own estimates. Cf. his article in English: Japanese National Income, in the "*Oriental Economist*", Vol. 18, No. 441-3, June 1951.

Some revisions of Yamada's estimates have been attempted in the following articles. They are all written in English.

- (2) Shigeto Tsuru, Kazushi Ohkawa, Chotaro Takahashi and Isamu Yamada, Long Term Changes in the National Product of Japan since 1875.

This was an attempt to revise the estimate given in (1) regarding national product, and was presented as a preliminary paper to the Second Meeting of International Association for Research in Income and Wealth, 1951.

- (3) Shigeto Tsuru and Kazushi Ohkawa, Long Term Changes in the National Product of Japan since 1878, in "*Income and Wealth, Series III*," edited by Milton Gilbert, 1953.

This is a revised version of the preliminary paper above mentioned, taking into consideration the valuable suggestions from Mr. Harry Oshima of the Statistical Office of United Nations. Mr. Oshima subsequently contributed a critical article on Japanese national income estimates for "*Keizai Kenkyu*" (*Economic Review*) of the Institute of Economic Research of the Hitotsubashi University, Vol. 4, No. 3.²

- (4) Kazushi Ohkawa, A Note on "Long Term Changes in the National Product of Japan", in the "*Annals of the Hitotsubashi Academy*", April 1953.

A further revision of the statistical side of the above article.

Furthermore, some articles concerning the subject matter are found in the "*Keizai Kenkyu*" (*Economic Review*) of the Hitotsubashi University. They are written in Japanese, with some English notes.

- (5) Shigeto Tsuru, Chotaro Takahashi and Kazushi Ohkawa, "Analysis of the National Income Estimates of Japan," *ibid.*, Vol. 2. No. 4, October 1951.
- (6) Kazushi Ohkawa and Associates, "The Rate of Growth in Japan's Economy," *ibid.*, Vol. 3, No. 1, January 1952.
- (7) Chotaro Takahashi and Miyohei Shinohara, "Capital Formation in Japan", *ibid.*, Vol 4, No. 1, January 1953.

Occasion is taken to mention that the Institute of Economic Research of the Hitotsubashi University is now engaged on the compilation of historical statistical data concerning the national income, but the results will not be finally available for a few years.

3. *My Estimate of National Income in Three Aspects*

The present writer's own estimates of national income from 1875 to 1942 have been made in three different ways, viz. (a) national income produced or national product, utilizing mainly production statistics, (b) national income distributed, as the sum total of individual incomes, and (c)

² For Mr. Harry Oshima's article, see Appendix II of this Article.

national income expended or national expenditure, including various kinds of disbursements. Since Tsuru and Ohkawa reviewed my method of preparing estimates in their article published in "*Income and Wealth, Series III*", I need not repeat it here,³ but will indicate only the results of the estimation concerning three aspects of national income. The following table gives the quinquennial averages of national income in three series for 1875-1942, with the percentage of differences as shown in formula.

Table III. My Estimates of National Income
(in current million yen)

Period	National product (a)	National income distributed (b)	National expenditure (c)	Differences	
				(a)-(b) (a)	(a)-(c) (a)
1875-77	527	—	—		
1878-82	726	—	—		
1883-87	828	—	—		
1888-92	1,165	968	—	+17	—
1893-97	1,666	1,095	1,157	+37	+31
1898-02	2,419	1,851	1,648	+23	+32
1903-07	2,801	2,787	2,756	+ 1	+ 2
1908-12	3,688	3,503	3,405	+ 5	+ 8
1913-17	4,964	4,507	4,815	+ 9	+ 3
1918-22	11,882	12,031	10,846	- 1	+ 9
1923-27	13,804	12,754	12,428	+ 8	+10
1928-32	12,184	11,911	13,035	+ 2	- 7
1933-37	15,509	15,376	16,278	+ 1	- 5
1938-42	32,052	34,207	36,824	- 7	-15

Y. Yamada, *op. cit.*, Table 19, 20 and 21. Figures partly revised here.

As may be seen in the table, there exist great differences among these three series, although they are so defined that they should be equal to each other.⁴ It should be noted, however, that discrepancies in the three series can not be avoided, in so far as they are based on quite different data. Moreover, for the earlier years the figures are very rough, and in the later years also the calculation as to depreciation, indirect tax and so on are not always accurate, owing to the lack of available data.

³ It should be noted, however, that Tsuru and Ohkawa confined their observations to the national product only, although my estimates cover three aspects of national income.

⁴ Theoretically speaking, three aspects of national income are expressed after the Keynes's Symbols:

$$A - U = F + P = C + S$$

A (gross value of product), U (producer's good consumed), F (factor's cost), P (profit), C (consumption) and S (saving). Each item may be divided into several sectors and activities in a complicated way.

Nevertheless, the very fact of disparities among the three kinds of national income as above estimated suggests the direction of improvement, which may be expected in two ways; first, to seek for better or still undiscovered data, and secondly, to reexamine some of the bold assumptions employed in filling the gaps of existing data. Ohkawa has made a further step to revise my figures, as far as the national product is concerned. Now I shall turn to Ohkawa's estimate.

4. Ohkawa's Estimate of National Product

Ohkawa's revised estimate is designated as (O) in the following table, compared with my two kinds of estimates, (Ya) and (Yb), each series in the quinquennial averages.

Table IV. Ohkawa's Estimate, compared with Yamada's
(in million yen)

	Ohkawa National product (O)	Yamada National product (Ya)	Differences (O)-(Ya) (O)	Yamada National income distributed (Yb)	Differences (O)-(Yb) (O)
1878-82	659	726	-10		
1883-87	600	828	-38		
1888-92	797	1,165	-46	968	-21
1893-97	1,191	1,666	-40	1,095	+ 8
1898-02	1,922	2,419	-26	1,851	+ 4
1903-07	2,482	2,801	-13	2,787	-12
1908-12	3,309	3,688	-11	3,503	- 6
1913-17	4,518	4,964	-10	4,507	0
1918-22	11,186	11,882	- 6	12,031	- 8
1923-27	12,598	13,804	-10	12,754	- 1
1928-32	11,840	12,184	- 3	11,911	- 1
1933-37	15,698	15,509	+ 1	15,376	- 2
1938-42	32,352	32,052	+ 1	34,207	- 6

Ohkawa's estimate is found in his recent article in the "*Annals of Hitotsubashi Academy*", April 1953. It is somewhat different from the estimate given in his (and Tsuru's) article in "*Income and Wealth, Series III*," 1953. As for Yamada's estimates, see the Table III.

As will be seen in the table, the difference is generally larger between (O) series and (Ya) series than between (O) and (Yb). It should be noted, however, that Ohkawa attempted to revise my figures regarding national income produced, and that therefore the lower degree of difference between (O) and (Yb) is rather accidental.

In order to clarify the causes of difference between (O) and (Ya), I will show the figures divided into three sectors, viz. primary, secondary and tertiary sectors, after the manner of Mr. Colin Clark.

Table V. (A) National Income divided into Three Sectors
(in million yen)

Period	Ohkawa			Yamada		
	Primary O ₁	Secondary O ₂	Tertiary O ₃	Primary Y ₁	Secondary Y ₂	Tertiary Y ₃
1878-82	426	70	163	276	128	322
1883-87	327	87	183	267	149	412
1888-92	432	129	235	415	221	529
1893-97	612	223	357	571	355	740
1898-02	932	421	569	827	572	1020
1903-07	1141	514	827	1112	659	1031
1908-12	1403	713	1193	1377	933	1379
1913-17	1636	1218	1664	1628	1548	1789
1918-22	3826	2890	4470	3832	3383	4667
1923-27	3503	3124	5971	3223	3790	6791
1928-32	2580	3282	5978	2423	3743	6019
1933-37	3084	5091	7523	2837	5149	7523
1938-42	5547	13241	13564	5337	13163	13564

(B) Differences

Period	$\frac{(O_1)-(Y_1)}{O}$	$\frac{(O_2)-(Y_2)}{O}$	$\frac{(O_3)-(Y_3)}{O}$
1878-82	+22.8	- 8.8	-24.1
1883-87	+10.1	-10.4	-38.4
1888-92	+ 2.1	-11.6	-36.9
1893-97	+ 3.4	-11.1	-32.1
1898-02	+ 5.5	- 7.9	-23.5
1903-07	+ 1.2	- 5.8	- 8.2
1908-12	+ 0.8	- 6.6	- 5.6
1913-17	+ 0.1	- 7.3	- 2.8
1918-22	- 0.1	- 4.4	- 1.8
1923-27	- 2.2	- 5.3	- 6.5
1928-32	+ 1.3	- 3.9	- 0.3
1933-37	+ 1.6	- 0.4	- 0.0
1938-42	+ 0.6	- 0.2	- 0.0

The detailed notes to this table are omitted, as Ohkawa has explained them in his article recently published. Here I would like to draw attention to the results of the differences between Ohkawa's series (O) and Yamada's series (Y), which are summerized as follows: first, the differences are larger for the earlier periods than for the later periods; secondly, they are larger for the tertiary sector than for the secondary and also larger for the latter than for the primary; and thirdly, differences have plus (positive) signs almost all the way through in the primary sector and minus (negative) signs in the other sectors. Thus Ohkawa's estimate, if more correct than mine, brings out the undue weight given to the tertiary sector in my estimate, the point which Mr. Oshima suggested on another occasion. Anyhow, we must accept for the present Ohkawa's estimate, so far as the national product is concerned.

5. *Comparison of Mr. Colin Clark's Estimate with Ours*

Now in turning to a comparison of Mr. Colin Clark's estimate with ours, I shall take, this time, his figures computed in current yen, besides those in I. U. as quoted in the beginning of the present paper. His figures, it will be noted, are divided into three parts; first, for 1883-1912, basing chiefly on products statistics; second, for 1913-32, originating in Prof. Hijikata's estimate of national income in the aspect of distributive shares, such as wages, profit, etc.; and last, for 1933-42, originating in estimates by the Japanese Economic Federation, a mixture of both aspects of production and distribution. The first and the last parts should be compared with Ohkawa's estimate (O) and the second part with my estimate (Yb). The following table compares those estimates in the quinquennial averages.

Table VI. Comparison of Mr. Colin Clark's Estimate with Ours
(in million yen)

Period	Colin Clark	Ohkawa	$\frac{(O)-(C)}{(O)}$	Yamada (Yb)	$\frac{(Yb)-(C)}{(Yb)}$
1883-92 (1887)	580	698	+17	—	—
1893-02 (1897)	1,060	1,556	+32	1,473	+28
1903-12 (1908)	2,210	2,936	+25	3,145	+30
1913-17 (14-17)	3,380	4,518	+25	4,507	+25
1918-22	9,680	11,186	+23	12,031	+20
1923-27	13,390	12,598	- 6	12,754	- 5
1928-32	12,050	11,840	- 2	11,911	- 1
1933-37	16,690	15,698	- 6	15,376	- 8
1938-42	34,090	32,352	- 5	33,698	- 1

Bracketed figures in the first column indicate the years of Colin Clark's estimate. Cf. Colin Clark, *op. cit.*, p. 136. As for (O) and (Yb), see the Table IV.

In this table we find that our figures are larger for the earlier periods and smaller for the later periods than Mr. Colin Clark's, a fact that will result in a rate of income growth less than Mr. Colin Clark has computed.⁵

6. *Rate of Income Growth*

Here is the rate of income growth given by Ohkawa on the basis of his estimate of national income above mentioned. To compute the rate of growth, the nominal value of national income must be deflated. Ohkawa compiled a new deflator, rearranging carefully several old wholesale price indices. I shall show his way of computing the rate of income growth in the following table.

Table VII. (A) Nominal and Real Income with Rate of Growth
computed by Ohkawa
(in million yen)

Period	Nominal national income	Deflator 1928-32 average=100	Real national income	Rate of Growth
1878-82	659	46.3	1,407	—
1883-87	600	33.8	1,784	4.8
1888-92	797	37.1	2,140	3.7
1893-97	1,191	41.7	2,845	5.8
1898-02	1,922	53.1	3,618	4.9
1903-07	2,482	63.5	3,886	1.2
1908-12	3,309	68.5	4,813	4.4
1913-17	4,518	81.2	5,554	2.9
1918-22	11,186	150.4	7,087	4.9
1923-27	12,598	139.6	9,081	5.1
1928-32	11,840	100.0	12,089	5.3
1933-37	15,698	107.4	14,564	4.2
1938-42	32,052	184.6	17,609	3.9

(B) Rate of Growth in Overlapping Decades

Period (overlapping decades)	Rate of growth per year
1878-87 to 1883-92	4.2
1883-92 to 1888-97	4.9
1888-97 to 1893-02	5.4
1893-02 to 1898-07	3.0

⁵ Mr. Colin Clark rejected Gini's figure of 1913 at 48,000 million yen (*op. cit.*, p. 139). I have not read Gini's article, but our estimation for that year may be between Gini's and Clark's.

1898-07	to	1903-12	3.0
1903-12	to	1908-17	3.5
1908-17	to	1913-22	4.1
1913-22	to	1918-27	5.1
1918-27	to	1923-32	5.5
1923-32	to	1928-37	4.7
1928-37	to	1933-42	3.8

The rate of growth was calculated incorrectly in Ohkawa's article in the "*Annals*". It has been amended here by himself.

The rate of income growth as shown in this table is not generally so high as Mr. Colin Clark concluded. The average rate for the whole period is 3.6 %.

As for the deflator, we know the wholesale price index is not adequate, but we have no other indices available for the length of period we wish to deal with. The deflator compiled newly by Ohkawa is somewhat different from that used hitherto. He compiles further a sub-group index for agricultural commodities and another for non-agricultural commodities, with which he calculated real income and rate of growth in each sector of industries, but here I shall only show the result computed by him.

Table VIII. Rates of Growth for Each of Three Sectors,
computed by Ohkawa

Period	Primary	Secondary	Tertiary
1878-87 to 1883-92	1.1	9.1	5.6
1883-92 to 1888-97	1.4	7.0	4.7
1888-97 to 1893-02	3.4	7.7	5.3
1893-02 to 1898-07	2.0	3.8	3.3
1898-07 to 1903-12	1.2	2.9	5.1
1903-12 to 1908-17	1.7	6.0	4.5
1908-17 to 1913-22	2.6	5.6	5.3
1913-22 to 1918-27	1.5	4.7	7.9
1918-27 to 1923-32	-0.8	6.7	7.9
1923-32 to 1928-37	0.8	7.6	4.7
1928-37 to 1933-42	1.8	8.0	1.8

Apart from some irregularities, this table shows a low rate for the primary sector and a high rate for the other sectors. The rate for the secondary sector is, on the average, a little more than that for the tertiary sector.

7. *My Estimate of Savings*

Along with the statistics for estimating the income growth, we are trying to improve the estimates of savings. It goes without saying that the proportion of savings to total income is an important factor in understanding the degree of income growth. But, here also, we face the deficiency of statistical data for the earlier years.

First I shall present my own estimate, given in the above mentioned book, which is based chiefly on the statistics of finance. We have statistical data regarding various deposits and securities since 1893. Government investment data are available only for the later years. I arranged these data when I estimated national expenditures. I shall show here the figures of national expenditures classified into several items and the proportion of savings to the total sum.

*Table IX. My Estimate of National Expenditures and
the Proportion of Savings
(A) Private Expenditures classified into Consumption,
Savings and Tax (in million yen)*

Period	Consumption	Savings (1)	Tax	Total (2)	$\frac{(1)}{(2)}$
1893-97	964	103	90	1,157	8.9
1898-02	1,400	100	148	1,648	6.1
1903-07	2,205	303	248	2,765	11.1
1908-12	2,783	288	334	3,405	8.5
1913-17	3,444	695	378	4,517	15.4
1918-22	7,050	2,268	931	10,249	32.1
1923-27	9,219	1,309	1,060	11,588	11.3
1928-32	9,469	1,206	1,002	11,677	9.9
1933-37	11,351	2,900	1,177	15,428	18.8
		(1,900)		(14,428)	(13.0)
1938-42	17,956	15,600	4,074	37,630	41.6
		(8,600)		(30,630)	(28.3)

(B) National Expenditure, including Government Account
(in million yen)

Period	Consumption		Savings				Total expenditure (4)	(3) (4)
	Private	Government	Private	Government	Abroad	Sub-total (3)		
1913-17	3,444	336	695	64	276	1,035	4,815	21.5
1918-22	7,050	1,297	2,268	255	-24	2,499	10,846	23.0
1923-27	9,219	1,693	1,309	328	-121	1,516	12,428	12.2
1928-32	9,469	1,965	1,206	348	47	1,601	13,035	12.3
1933-37	11,351	2,845	2,900	573	-364	3,109	17,305	17.5
			(1,900)			(2,109)	(16,278)	(12.3)
1938-42	17,956	10,641	15,600	1,309	-1,788	15,121	43,723	34.5
			(8,600)			(8,121)	(36,824)	(22.3)

Cf. Yuzo Yamada, *op. cit.*, Table 21. But (B) has been somewhat corrected here. Government consumption excludes transfer income, and Government investment for 1913-27 is estimated to be 20% of expenditure, the same rate as for 1928-37.

The bracketed figures for 1933-37 and 1938-42 indicate savings reduced by the amounts of credit expansion originating in "indigested public bonds issue," 1000 and 7000 million yen respectively in round figures.

On account of the deficiency of data, the estimates are shown in two different ways, viz. (A) not including government account and investments abroad, and (B) including those items. The rate of saving for the years before 1908-12 was below 12% in (A) and that for the years since then was above 12%, but not over 23% in (B).⁶ The estimate of private consumption before 1930 is made on rather a bold presumption, i. e., by utilizing the changes of income below the tax exemption limit to carry back the basic consumption of 1930 to the earlier years. As to private savings, they include the net increase of all kinds of deposits, with cash and cash-deposits and securities, but do not include construction. According to investigations published by the Economic Stabilization Board, the net increase of house construction amounts to 274 million yen per year for 1930-32, 368 million yen for 1933-37, 627 million yen for 1938-42. Thus, if we take these amounts into consideration, the proportion of savings in (B) table

⁶ The remarkable high rate of saving (in non-blackened figures) for 1938-42 is due mainly to enforced saving or restricted consumption during the war, which began in 1937. The figures are computed here from the monetary expenditure side, not capital formation in the proper sense, and they contain the amounts of credit expansion originating in the so-called "indigested public bond issue" which amounted to 7000 million yen. Now, if we reduce those amounts from the total savings, on the assumption that the credit expansion at that time did not turn to the purchase of consumers' goods which were restricted by rationing and fixed prices, then the rate of savings for that period will be lower, as shown in the table. Furthermore, if we compute the savings in real terms, taking the price difference between producers' goods and consumers' goods into consideration, we may get a much lower rate. This note is in response to a question put to me by Mr. G. F. Shirras at the Castelgandolfo-Meeting.

should be increased by about 2 %. The estimate of savings, however, in the above table is gross, including depreciation, so that the net saving will be smaller by 3 or 4 percent.

Anyhow, we may conclude that the proportion of net savings seems to be generally less than 20 %, although the above estimates are insufficient on account of lack of necessary items. On the average the ratio may be between 16 % and 17 %, much less than Colin Clark's figures.

8. Ito's and Shinohara's Estimates of Savings

Recently Masakichi Ito attempted to estimate the savings from national wealth statistics. Mr. Colin Clark also seems to use the wealth statistics, when he estimates the savings of Japan in his work. But Ito carefully examined the data and obtained somewhat different results.⁷

We have the statistical data of national wealth for several scattered years: viz., for 1905, 1910, 1917 by the Bank of Japan, for 1913 and 1919 by Kokuseiin (State Investigation Board), and for 1924, 1930 and 1935 by the Cabinet Statistics Bureau. The data given by the Bank of Japan are too crude to be made use of. Ito rearranged the available data since 1913 and selected items relevant to capital formation—harbour equipments, trees, buildings, machines, live-stock and poultry, rails, vehicles, ships, water-works, power-plants, gas-works, equipments for communications, bridges, various kinds of products and imported goods. Ito pointed out that Mr. Colin Clark's figures seem to be the total sum of wealth excluding only the value of land.⁸ Ito's estimate of capital amounts is as follows.

Table X. Ito's Estimate of Capital Amounts
(in million yen)

Period	Nominal amount	Deflater	Real amount
1913	16,515	73.1	22,523
1919	43,308	172.3	25,135
1924	60,665	150.8	40,229
1930	50,196	91.2	55,039
1935	62,640	102.5	61,112

⁷ Ito's calculation is found in the "*Keizai Kenkyu*", Vol. 3, No. 1, January 1952, but here I am indebted to his unpublished article on this subject.

⁸ At the Meeting in Castalgandolfo, Mr. Colin Clark told us that he computed the cost of house-building at American prices.

Table XI. Additional Capital and Its Proportion
to National Income (in million yen)

Period	Additional capital	ditto. per year (1)	National income (2)	$\frac{(1)}{(2)}$
1914-19	2,542	424	6,028	7.0
1920-24	15,094	3,019	7,563	39.9
1925-30	14,810	2,468	10,414	23.7
1931-35	6,078	1,215	13,775	8.8
1914-35	38,519	1,751	9,344	18.7

The above two tables are quoted from Ito's unpublished article.

Ito formulized the relation between capital amount (K) and national income (Y) in the regression line:

$$K = 4.4904 Y - 1.752, \text{ (} K \text{ and } Y \text{ are in billion yen.)}$$

There are great disparities between the amount of capital given by Ito and the estimates of savings given by me. The latter figures deflated to real values are: 1,277 million yen for 1931-17, 1,662 for 1918-22, 1,091 for 1923-27, 1,601 for 1928-32, 1,845 for 1933-37 and 1,454 for 1938-42. But the 18.7% proportion of savings or additional capital to the total income on the average, is somewhat higher than my estimate, for Ito's estimate indicates "net" increase of capital.

However, as may be seen in the table, the proportion of savings shows great irregularities from year to year, which are perhaps due to the imperfect character of the original data. Ito points out that the capital amount in 1919 seems to be underestimated, and the amount in 1924 overestimated, the ratio of capital to income being calculated rather low (3.8) in 1919 and rather high (4.7) in 1924. The statistics of national wealth in Japan must be improved in the future. For the present, we might well call attention to the average figure of the proportion of savings 18.7% for 1914-35 given by Ito, which, although somewhat higher than my estimate, is far below the figures given by Mr. Colin Clark.

Another estimate of the so-called "capital formation by the flow-of-goods method" has been attempted recently by Miyoehei Shinohara.⁹ With great effort, he estimates the value of durable equipments and construction annually produced, the estimate of inventories being still absent. According to his results, the ratio of investment (gross, but excluding changes in inventories) to national income (net of depreciation) is on the average 16 or 17% for 1919-36. The disparities between the figures given by me and

⁹ Miyoehei Shinohara: Capital Formation in Japan, in the "Keizai Kenkyu", Vol. 4, No. 1, January 1953.

Shinohara are great from year to year, viz. 2,195 million yen by Shinohara and 2,499 by me for 1919-22, 2,123 and 1,516 for 1923-27, 2,019 and 1,516 for 1928-32 and 3,036 and 1,982 for 1933-37. The main reason for this, apart from the difficulty of valuation, may be found in the difference between goods-flow and money-flow. But 16 or 17% level given by Shinohara, excluding inventories, may be not so inconsistent with my estimate, which does not include house construction.

9. *Some Concluding Remarks*

It must be admitted that our estimates herein are very imperfect. As for income growth as well as savings, the various estimates stand side by side, and there are great discrepancies among them. I am aware that it is necessary to achieve a greater degree of consistency among our estimates, but for the present I must be content with the results above stated. Here I would like to make some concluding remarks:

(1) The rate of income growth in Japan was on the average 4% and the rate of savings was in the neighbourhood of 16% for 1913-38. Both rates are indeed high, but not so high as Mr. Colin Clark believed.

(2) The rates of income growth are found to fluctuate in a direction opposite to the changes of the rate of savings, which, in turn, fluctuate in parallel with the changes of price index.

Period	Rate of income growth	Rate of savings	Price index
1913-17	2.9	21.5	81.2
1918-22	4.9	23.0	150.4
1923-27	5.1	12.2	139.6
1928-32	5.3	12.3	100.0
1933-37	4.2	12.3	107.4
1938-42	3.9	22.3	184.6

If we can ascertain that the prices of producers' goods rise or fall to a greater degree than those of consumers' goods, we may be able to establish that the rate of savings revised by such prices data will move in a narrower range, around, say, 16%.

(3) The economic growth in Japan, so far as the period we have treated is concerned, proceeded steadily, seemingly not much affected by industrial fluctuations. The fall of prices did not decrease, but rather increased the real output. A steep expansion of industrialization and foreign trade was taking place, and the change of structure was more dominant than the price fluctuation. The proportion of income of the secondary sector to the total income rose from 25% in the first period to 40% in the last period. The

ratio of exports or imports to the national income was between 20 and 15%.

(4) If we adopt Harrod's formula $GC=s$, and assume that $s=16$ and $G=4$, then we may say $C=4$. According to Ito's estimate, the relation between capital amount (K) and national income (Y) is expressed in the regression line: $K=4.4904Y-1.752$, (K and Y are in billion yen). It follows that $\frac{K}{Y}$ is between 4.1 and 4.4 for the period treated here by us, and $\frac{\Delta K}{\Delta Y}$

is just 4. Although Harrod's " C " is, strictly speaking, not $\frac{\Delta K}{\Delta Y}$, our conclusion $C=4$ may be yet approximately admitted. But it should be noted that such round figures for the formula $GC=s$ may be taken as the start, not the goal, of economic observations and that further investigations may be required as to, for example, the allocation of capital or natural resources among various sectors of industries.

(5) Such rates as 4% in economic growth and 16% in the proportion of savings may be not unreasonable in an advancing economy. The high rate of income growth in Japan depended chiefly upon her rapid industrialization during the period. I will not here embark upon a more detail explanation of the background, but, in passing I must say that it may be difficult, if not impossible, for Japan to continue at such a high rate in future under the completely changed conditions of international relations. It may be added that in spite of the high proportion of savings the income growth is severely restricted by a tremendous lack of natural resources, and to find the most efficient way of utilizing the meagre resources that are available is of the utmost importance. Furthermore, Japan has suffered formidable destruction of her wealth due to frequent natural and other calamities, and capital accumulation is not always steadily proceeding. The destruction of wealth by the last war was so great that it will take many years, even under the condition of fairly high savings, to recover to the former position.

Appendix. I. *After the War*

Since the war, we have a rather reliable estimate of national income in Japan, published by the Economic Stabilization Board (now the Economic Counsel Board), as far as national income distributed is concerned, the figures for which we shall give. The rate of income growth after the war has been very great as may be expected.

Table XI. National Income and its Rate of Growth after the War, estimated by Economic Counsel Board
(in billion yen)

Period (fiscal year)	Nominal national income	Deflator	Real national income	Rate of growth
1934-36	14.5	1	14.5	
1946	386.7	43	9.0	
1947	1,041.2	115	9.1	1.1
1948	2,123.6	192	11.1	21.9
1949	2,844.8	229	12.6	13.5
1950	3,683.7	237	15.5	23.0
1951	4,849.5	288	16.8	8.4

Cf. Economic Counsel Board, *National Income after the War*, (in Japanese), 1953, p. 87. The deflator used here is a weighted average index of consumers' prices, rural and urban, and the prices of producers' goods.

The estimate of capital formation by Economic Counsel Board is based for the most part on financial and banking statistics. The capital formation in the following table (A) does not include government investments nor investments abroad, which we show separately in (B).

Table XII. Capital Formation and its Proportion to
(A) National Income (in billion yen)

Period (fiscal year)	Capital formation	ditto. net (1)	National income (2)	$\frac{(1)}{(2)}$
1934-36	3.7	2.7	14.5	18.6
1946	70.2	57.1	386.7	14.6
1947	204.6	163.6	1,041.2	15.7
1948	405.4	333.2	2,123.6	15.7
1949	391.1	281.2	2,884.4	9.7
1950	686.8	537.8	3,683.7	14.6
1951	1,113.1	876.9	4,849.4	18.1

(B)

Period (fiscal year)	Consumption	Capital formation	Investment abroad	Govern't exp.	Total gross exp.
1934-36	11.2	3.7	0.2	3.2	18.3
1946	333.1	70.2	-14.4	84.1	473.0
1947	915.5	204.6	-67.7	248.1	1,299.5
1948	1,755.8	405.4	-98.2	537.7	2,600.7
1949	2,285.1	391.1	-114.1	688.2	3,250.3
1950	2,563.1	686.8	116.6	699.4	4,065.9
1951	3,178.1	1,113.1	97.0	936.9	5,324.8

Economic Counsel Board, *The National Income after the War* (in Japanese), p. 42, 50.

In the above table, the government expenditure is not divided into consumption and investment. Only for 1950 and 1951, we have the following figures of all investments, inclusive of government investments.

Table XIII. Capital Formation, including Government Investment (in billion yen)

Period (calendar year)	Private capital formation		Investments abroad	Govern't investments	Total (1)	National gross exp. (2)	(1) (2)
	House & equipment	Inventories					
1950	265	133	58	216	672	3580	18.7
1951	496	374	61	243	1174	4780	24.6
"	(333)	(266)	(-16)	(188)	(671)	(3839)	(17.5)

Cf. Economic Stabilization Board, *The Annual Report of National Economy*, (in Japanese) 1952, supplementary tables. The figures in brackets are deflated by the specific price indices for the respective items of national income, on the basis of 1950.

Appendix II. Comment on Mr. Harry Oshima's Discussion on Yamada's Estimates.

In his article "Survey of Various Long-term Estimates of Japanese National Income,"¹⁰ Mr. Harry Oshima devotes a great part for a valuable discussion on the methods of estimating in my book—"Nihon Kokumin Shotoku Suikei Shiryo". I am most grateful for his many useful suggestions, which without doubt will promote the further improvement of my own incomplete work. Here I would like to summarize the points at issue and comment briefly on them.

¹⁰ Harry Oshima's article, in the "Keizai Kenkyu", Vol. 4, No. 3, July 1953.

The discussion is confined to the national product estimates for earlier period. For the numbering and itemizing, I am fully responsible. My comments are in brackets.

- 1) Leakage of minor items in production statistics.
 - 1.1) For agriculture some adjustment is made, but is incomplete. (Ohkawa has improved upon it recently.)
 - 1.2) For fishery, mining and manufacturing, no adjustment is made. (Tsuru and Ohkawa calculated the proportion of mining products to manufactured products in the later period, and applied this proportion to the earlier period. For the deficiencies in factory production statistics, I myself intended to adjust the figures by raising the amount of home industry. But, I admit that this method is very incomplete.)
 - 1.3) Discrepancies between the production statistics and the export statistics are not taken into consideration. (I was aware of this, but could not check both figures with each other).
- 2) The neglect of self-consumption in peasant households, such as food, fish, wood, hunting, weaving, etc. (This involves the examination of farm households statistics for the earlier period, which are not yet available to us. A search for better historical data is necessary).
- 3) The incomplete estimation of the ratio between the gross value of products and the net value of income.
 - 3.1) The ratio for agriculture is undervalued. (This point has been also somewhat improved by Ohkawa).
 - 3.2) The ratio for factories is overvalued. (I took it as computed in a position between home industry and factory. Of course it is very approximate, although a change in scale should be considered. I would like to examine the historical data of the textile industry on this point).
- 4) The incompleteness of labour force data used for the estimation of home industry as well as tertiary sector. (The original data should be carefully reexamined).
- 5) The inadequacy of using the Tokyo price index as deflator. (Ohkawa calculated the agricultural price index for a long period in his recent article).

As a whole, I do not find any objection to Mr. Oshima's critique. But, on this occasion, I would like to repeat what I intended to convey in my book. It seems to me that there are two stages of collecting scattered data, the first being the sifting of available data in various aspects, and that is the main purpose of my book. The second stage involves the checking of data with each other, and Mr. Oshima's suggestions may belong to this stage. He says:—"The possibility of obtaining reliable measures of economic growth for the Meiji period lies in developing adequate occupational distribution data. If approximately reliable totals and major breakdowns can be

had, these can be used as controlling totals, instead of production data which do not seem to cover output comprehensively." He may be right as far as the second stage is concerned. But my main intention is to collect and compile data on production, distribution and expenditure, respectively,—the three aspects of national income. Furthermore, my intention is not merely to know the aggregate total sum of national income, but rather its constitution or circulation. If our object were to be the estimation of national income as a whole, it might be measured from any one of these three aspects or a mixture of them, whichever is confirmable without much difficulty. But if we wish to grasp the constitution or circulation of national income, all these aspects must be ascertained separately and their interrelationship clarified. However, it is not necessary to say that this intention of work does not permit the incompleteness of each series, and I must proceed to my next step by means of the valuable suggestions given by Mr. Oshima.

BUSINESS INCOME DURING THE INFLATION IN JAPAN

by ICHIRO KATANO

Professor of Accounting

I. *Chronic Downward Trend in the Value of the Yen*

In his book, *Money Illusion* (New York, 1928, p. 4), the following view was developed by Irving Fisher:

“We simply take it for granted that all money is stable, just as centuries ago, before Copernicus, people took it for granted that this earth was stationary, that there was really such a fact as a sunrise or a sunset. We know now that sunrise and sunset are illusions produced by the notation of the earth around its axis, and yet we still speak of, and even think of, the sun as rising and setting! We need a somewhat similar change of ideas in thinking about money”.

Another concept was pointed out by the American Institute of Accountants, *Changing Concept of Business Income: Report of Study Group on Business Income* (New York, 1952, p. 20).

“The postulate that fluctuations in the value of the monetary unit may be ignored is probably the longest established of the three mentioned. From which it follows that income or profit in a given year may arise in part from manufacture or trading, and in part from changes in the value of the monetary unit during the period. The significance of the two types of profit is by no means the same for purposes for which determinations of income or profit are most commonly made”.

The above two views stated by Americans are more characteristic for Japan than for the United States of America. The problem of ‘Fluctuating Price Levels in Relation to Accounts’, brought up for discussion at the Sixth International Accounting Conference held in London on June 1952, is very important and deserves to be considered in business accounting especially in Japan.

Japan has suffered acutely from the vicious inflation during four years succeeding to the termination of World War II, when the Yen depreciated drastically. But, even in former times, we experienced chronic inflation

for the past seventy or eighty years, not comparable with those in the United States and England. However, business accounting in Japan, adhering to the maintenance of nominal monetary capital, has been for a long time based on the premise that the value of the Yen as a calculating measure remained as 'unchanged', as the Ptolemaic theory before Copernicus. The expressions that "income or profit in a given year may arise in part from manufacture or trading and in part from changes in the value of the monetary unit during the period. The significance of the two types of profit is by no means the same for purposes for which determinations of income or profit are most commonly made" can be very well applied to the yen-accounting, not merely during the recent inflation period after the War, but also to the long period back to the early Meiji era and lasting still to the present.

Wholesale Prices Index in Japan

1873 (Meiji 6)	100	1903 (Meiji 36)	199
1874 (" 7)	108	1904 (" 37)	209
1875 (" 8)	113	1905 (" 38)	224
1876 (" 9)	108	1906 (" 39)	231
1877 (" 10)	111	1907 (" 40)	249
1878 (" 11)	117	1908 (" 41)	240
1879 (" 12)	128	1909 (" 42)	229
1880 (" 13)	146	1910 (" 43)	232
1881 (" 14)	162	1911 (" 44)	240
1882 (" 15)	156	1912 (Taisho 1)	255
1883 (" 16)	126	1913 (" 2)	253
1884 (" 17)	110	1914 (" 3)	243
1885 (" 18)	112	1915 (" 4)	246
1886 (" 19)	104	1916 (" 5)	298
1887 (" 20)	108	1917 (" 6)	375
1888 (" 21)	113	1918 (" 7)	491
1889 (" 22)	118	1919 (" 8)	601
1890 (" 23)	124	1920 (" 9)	661
1891 (" 24)	115	1921 (" 10)	511
1892 (" 25)	112	1922 (" 11)	499
1893 (" 26)	126	1923 (" 12)	508
1894 (" 27)	133	1924 (" 13)	526
1895 (" 28)	143	1925 (" 14)	514
1896 (" 29)	153	1926 (Showa 1)	456
1897 (" 30)	170	1927 (" 2)	433
1898 (" 31)	180	1928 (" 3)	436
1899 (" 32)	181	1929 (" 4)	424
1900 (" 33)	194	1930 (" 5)	349
1901 (" 34)	185	1931 (" 6)	295
1902 (" 35)	187	1932 (" 7)	327

1933 (Showa 8)	375	1943 (Showa 18)	806
1934 (" 9)	382	1944 (" 19)	914
1935 (" 10)	392	1945 (" 20)	1,380
1936 (" 11)	408	1946 (" 21)	6,411
1937 (" 12)	496	1947 (" 22)	18,972
1938 (" 13)	523	1948 (" 23)	50,403
1939 (" 14)	578	1949 (" 24)	82,253
1940 (" 15)	647	1950 (" 25)	97,242
1941 (" 16)	693	1951 (" 26)	134,957
1942 (" 17)	753	1952 (" 27)	137,650

The same is, of course, the case for the dollar-accounting in the United States and for the pound-accounting in England, though not at the same degree. But from the long-term point of view, the internal value of the Dollar and Pound has shown rhythmical fluctuation, like a pendulum which oscillates regularly, while for the Japanese Yen, the amplitude of pendulum-movements, even before the World War II, greatly deviated from its centre. Since the early Meiji period, the Japanese Yen has followed a long term downward trend of consistent depreciation, accompanied by short waves of upswings and downswings.

In American or English business enterprises, one may possibly compare figures of financial statements or cost reports at the end of the year 1952 with corresponding figures at the end of 1900, without any serious misconception; but in the case of Japanese ones such a comparison would be nonsense at all.

The accounting postulate of the constant value of money means that the accounting is established on the assumption that the value measure of money as a calculating unit is single. Therefore, wherever the actual value of money moves rhythmically up and down, its value measure from the long-term point of view is consistent, even if temporarily not so. On the contrary, wherever it fluctuates one-sidedly, the value measure must in the long run be inconsistent, and will present a problem which runs counter the postulate of the constant value of money upon which the accounting is established.

The determination of business income which are based on historical costs, in accordance with the postulate of the constant value of money, is now actively being discussed in the United States, England and other countries, because of fluctuating price levels. In Japan where the change in the value of the Yen shows a downward trend, not rhythmical but one-sided, the important affects of changing price levels on business accounting should be more deeply impressed on our minds than in the United States, England and the other countries.

II. *Post-War Vicious Inflation and Its Effects on Business Accounting*

Long-term fluctuations in the value of the Japanese Yen may roughly be classified in three stages: first, the period from the early Meiji era to the close of World War II, when the Yen showed, in general, a trend toward gradual depreciation, sometimes accompanied by wavelike ups and downs (from 1873 to the middle of 1945); second, the period of violent inflation for several years after the war (from the middle of 1945 to 1949); and third, the subsequent period of alleviated but still persisting depreciation (since 1950 —).

Not mentioning the pre-war situation, I shall content myself by stating some chief problems of income determination in business accounting of recent years subsequent to the postwar inflation, because the present accounting procedures in Japan retain evils caused by the postwar inflation.

Through the postwar inflation period, the Japanese government consistently adopted the official-price policy based on actual cost method. The prices of commodities were officially fixed by the actual costs spent on production plus an adequate profit, and when the official price could no longer be maintained, it was revised on the basis of new actual costs, following the blackmarket price. From the viewpoint of business accounting, income was computed on historical costs basis which rested on the postulate of the constant value of the monetary unit, in spite of the greatly depreciated currency.

In these circumstances, whenever prices of productive factors, especially raw materials and labour, advanced, they were immediately woven into selling costs of a product and reflected themselves upon the official price. Although the actual costs of materials and labour included in selling costs were covered in the sale of products, it usually costed more for a manufacturer to replace materials and labour required for current production. Accordingly, some amount corresponding to the increased cost of raw materials and labour had to be appropriated out of a calculated net profit. The same applied also to the depreciation charges of fixed assets included in the cost of production. Since depreciation charges were computed according to the rate prescribed in the tax law and on the basis of actual costs entered when the price level was lower. As regards obsolete assets, the amount covered by depreciation was only a fraction of the replacement value of the assets.

In the income determination of a business enterprise, the principle of constant value of the monetary unit has been consistently sustained, not only from the national economic viewpoint of price policy, but also in the tax legislation. Therefore, the increment of inventory price raised by the revision of official price was taken as 'profit' and taxed when this 'profit'

was realized through sale. Hence, most corporations, even if they showed a book profit, were actually barely able to maintain their business through increasing their capital or borrowing. The present capital composition in most Japanese corporations' balance-sheets, in general, shows a remarkable excess of the liabilities to owned capital, which is due borrowings to meet the money shortage during the recent inflation period brought about as above stated.

III. Revaluation of Fixed Assets

After the cessation of the post-war vicious inflation, the revaluation of fixed assets, mainly from the standpoint of the tax law, has been carried out three times, the first in 1950, the second in 1951, whilst the third is now in course of execution.

The economic significance of the revaluation of assets lies, needless to say, in the fact that it is supposed to eliminate the effects of the deteriorated value of money upon depreciation charge as a part of costs and to maintain the capital of the enterprise. It was obviously the idea of the *Report on Japanese Taxation by the Shoup Mission* (1949), the forerunner of the *Law on Revaluation of Assets* (1950), which suggested the use of the general price index as the base for revaluation.

"Even were there no practical difficulties in using specific indices and even though such indices were not affected by temporary disturbances, it would still be preferable on theoretical grounds to use a general index. For we are not trying to exempt from tax all gains, but only those gains that do not represent a real increase in purchasing power".

In other words, Professor Shoup's suggestion, intended to repair the damaged parts of the groundwork of depreciation in Japanese corporations, from the viewpoint of the national economy, by means of the method of Stabilized Accounting. I think, it was, of course, the ought-to-be of revaluation of assets that, according to this idea, it should be compulsory uniform to all corporations and should be carried out to a full extent, its appraisal basis being the index of general purchasing power of the Yen.

Through the inflationary period, the income determination in the enterprise rested consistently on the principle of the constant value of the monetary unit, from the viewpoint of national economic policy, and corporations generally had to incur immense debt in order to meet the depletion of their capital. This was the reason why for the Japanese economy, which was meager in economic resources and had been isolated from the world economy, there was no other way but to depend upon drastic control of goods, services and prices, so that the people could overcome the poverty and inflation caused by war.

If Japan had abundant economic resources, as the Soviet Union after World War I, isolated even from the world economy, or if it had been jointed to the world economy through free trade and free exchange as Germany after World War I, we might have adopted the method of Stabilized Accounting for all sectors of economy, namely for the personal, business and public sectors with good effects, as it had proved in the above stated countries.¹

Aside from these considerations, Prof. Shoup's suggestion of compulsory revaluation based on the idea of the adjustment of the monetary unit as a calculating measure was not in accord with the line of the voluntary revaluation advocated by the industrial circles, and the *Assets Revaluation Law* (April 25, 1950) resulted in a way acknowledging the voluntary revaluation for which the general price index (the wholesale price index of the Bank of Japan) was applied as basis. According to this law, corporations were free to revalue their assets or not, and they were allowed to determine adequate amounts within the legal margin.

In carrying out the first and second revaluation, corporations took the following three points into consideration: first, increased depreciation charges due to the raised book-values resulting from revaluation and a decreased rate in the corporate tax caused by it; second, the imposition of a tax of 6 per cent on Revaluation Reserve, the difference of the book value and the reappraisal value; and third, a probable increase of dividend outlays rising by the transfer of revaluation reserve to capital stock.

Under this manner, corporations used to revalue their assets at an amount most favorable to themselves. Accordingly, both the first (1950) and second (1951) revaluations can not be said to have met with satisfactory results. Corporations which carried out the first revaluation numbered about 30,000, revaluation values being 4,200 million yen against 700 million yen of book-value. The second revaluation was carried out by 4,600 corporations, of which 2,500 had also gone through the first revaluation, fixed assets of 60 billion (1,000,000,000) yen of book-value being revalued to 160 billion yen. Thus, the total number of corporations which carried out both the first and second revaluations was merely 16 per cent of all corporations, although major corporations mostly did not fail to do so. Details are shown on p. 104.

In accordance with the above mentioned reappraisal policy, the revaluation of fixed assets was based on, and computed from, the possible earning capacity of each corporation. Thus, the revaluation was diametrically reversed from the original aim to revise the distortions which the drastic changes in the general purchasing power of money brought about on depreciation. It resulted in the appraisal of fixed assets based on the accounting postulate of the constant value of money unit. If the revaluation had been

¹ For details of the inflation accounting in Germany and the Soviet Union after World War I, see I. Katano: *Stabilized Accounting*. Tokyo, 1949.

Combined Results of First and Second Revaluations

Capital Amount	Book-values of total assets of corporation which filed return	Total revaluation differences	Total revaluation values
(1,000 yen)	(1,000,000 yen)	(1,000,000 yen)	(1,000,000 yen)
Less than 200	11,263	10,584	21,847
" 500	12,435	7,464	19,899
" 1,000	23,169	14,959	38,128
" 2,000	16,074	13,921	30,016
" 3,000	13,551	9,689	23,240
" 5,000	15,664	14,319	29,983
" 10,000	8,255	24,160	42,415
" 50,000	24,977	53,110	78,087
" 100,000	19,625	41,101	66,326
over 100,000	92,687	535,906	628,593
Total or Average	247,720	725,813	973,533

applied to the full extent and uniformly as a compulsory measure along the line of Prof. Shoup's suggestion, the disorders in the business accounting, deeply rooted by the long-term chronic depreciation of money since the early Meiji period and the serious inflation after the war, might have recovered at once, and the business accounting in Japan, in the national economic scale, could have started afresh with the homogeneous figures.

As for the reasons, why the voluntary revaluations, both first and second, ended in insufficient results, we are faced with two major facts. The imposition of 6 per cent tax upon the revaluation reserve constituted no doubt the chief reason. Another reason, in my view, is the exchange rate which has been fixed to the dollar at 360 yen — this rate is now said to deviate about 120 or 130 yen for the general price level in Japan. In fact, it was a leading aim of the reappraisal policy for Japanese industries that they, highly related to export, should make profitable export prices based on the fixed exchange rate and thus should calculate a most favorable reappraisal value of fixed assets based on the cost of export goods.

The revaluation of fixed assets offers a good chance to correct the confusion in business accounting caused by the drastic depreciation of the Yen and restore the process of capital formation to a normal track. However, checked by the 6 per cent tax on revaluation reserves and the fixed exchange rate of 360 yen, most corporations are still not situated to grasp this possible best chance to correct the mistaken income determination practice which must result in the depletion of capital.

IV. *Limit of Capital Maintaining Function of LIFO Method*

Business accounting in Japan has been influenced by the continued downward trend in the value of the monetary unit following the post-war vicious inflation, even after the first and second revaluation of fixed assets. This is especially marked in enterprises where fixed asset revaluation was insufficient carried out or not at all. Japanese business men must more deeply keep in their mind the fact that an important factor in the present shortage of working funds is the outflow of imaginary profits resulting from a decline in currency value.

Meanwhile, the last-in-first-out valuation method adopted in the Revised Corporate Tax Law of 1950 appeared as an important measure of income determination to meet fluctuations in the value of the monetary unit. This regulation concerning inventory valuation in the tax law concerns the valuation for inventories outstanding at the end of an accounting period, but not the valuation of costing of inventories. However, control over the valuation of inventories outstanding at the end of an accounting period will eventually regulate the costing of inventories.

The LIFO method of costing inventories is to determine the inventory at acquisition cost most recently purchased, and its fundamental object is to charge current costs with current sales. In short, this method is to determine inventory costs in harmony with price fluctuations, thus reducing over-estimation of income in a period of rising prices and under-estimation in a period of declining prices and making it possible to level income in the long run.

This method has been adopted in the tax laws of the United States and has been considered practical for many years especially in a period of rising prices, as it prevents the shortage of stock of inventories necessary for the maintenance of reproduction in enterprises.

It is true that the LIFO method prevents to a certain extent the shortage of material capital caused by an outflow of income in the form of taxes and dividends through reducing the over-estimation of income in a period of rising prices. However, the income determination through this method is based on historical costs on the assumption of the stability of the monetary unit, so, from a long-term viewpoint, taxes which are reduced in a period of rising prices will become irksome in a period of declining prices. The absolute amount of taxes as a whole, therefore, will not be different from that of the FIFO (first-in-first-out) method. The LIFO method has only a meaning in the business financial policy, because the levelling of income and taxes has important effects on the manipulation of working funds in enterprises.

Special attention should be given to the following points: the effectiveness of the LIFO method in the determination of income as a measure of capital maintenance to meet fluctuations in the value of the monetary unit will mostly be found when economic conditions are as in the United States where its fluctuation is moderate and rhythmical; under the conditions which exist in Japan where the value of the Yen has continued to decline during a long time, though with rhythmical fluctuations in short period, the function of maintaining capital by this method is effective only for short periods and temporarily, and this method cannot be regarded as guaranteeing the capital maintenance of continuing enterprises.

In connection with the LIFO method of costing inventories, the problem of *'inventory profits and their nature of non-realized profits'* have recently often been discussed in Japan by those who advocate this method. My opinion on this problem is mentioned briefly hereunder.

The advocates of the LIFO method of costing inventories assert that on the assumption of maintaining normal amount of inventories, if this method is adopted, the book value of inventories at the end of an accounting period will be higher than at the beginning of the period when prices show a rising trend; the difference is a non-realized profit, because profits from an inventory are realized when the replacement of the said inventory is completed or secured, but not realized by the completion of sales; in short, so far as the continuance of the enterprise is concerned, it is correct to assert that profits are realized only through the cycle of purchase—manufacturing—sale—replacement; consequently, in the case when the value of the normal amount of inventories at the end of an accounting period is higher than at the beginning of the period due to a price advance, income in the said period involves a non-realized one which is equivalent to the difference of the inventory value.

According to my opinion, these advocates primarily take the attitude to maintain money capital by determining the business income based on historical costs on the accrued basis, and, within this concept, further to maintain material capital through a broader interpretation of the realization principle. This is advocated as a background to the LIFO method in the determination of income. But, this assertion will be admissible only from the stand point of a financial policy that the appropriation of income should be limited to the line which will guarantee the reproduction of continuing enterprises. The LIFO method may be advocated more positively in practical accounting in Japan as actual manifestation of the 'going concern' principle. However, the conception of 'inventory profits' must be rejected, so long as business income is based on the maintenance of money capital. It is self-evident that when prices of materials are higher at the end of an accounting period than at the beginning, larger funds will be necessary to secure a constant stock of goods. It is the problem whether the source of

these funds shall depend on capital subscription, or on borrowings, or on retained profits, and it is not proper to base it on the determination of income for the said period. Further, the idea that the difference in inventory values at the beginning and at the end of a period shall be regarded as nominal book profit cannot be considered, if the attitude is taken to regulate the concept of business income on the basis of maintaining money capital on the postulate of the constant value of money unit.

V. Tax Assessment on Income under Inflation and Maintenance of Capital

—An example appeared in Judicial Case—

The traditional practice of taxable income determination based on historical costs on the premise of the constant value of money unit, which was adhered during the inflation after the Pacific war, tended to fatally affect Japanese enterprises through a heavy tax burden. A typical example in the docket is mentioned below (No. 9 of an administrative case in 1951, Tokyo Local Court).

A steel-frame builder evaluated 1389.81 tons of rolled steel the cost of which had to be considered in the determination of taxable income for the fiscal year 1949 (accounting for more than 90 % of the total rolled steel utilized in the said year) at ¥12,000 per ton, slightly lower than the controlled market price of ¥15,000 for the fiscal year 1949, instead of the book value of ¥2,000 (which was the controlled price prevailing in March 1946 when returns of the property tax was made out). The taxation authorities refused this valuation and decided the income on the basis of ¥2,000 per ton, the book value. There was a difference of ¥10,000 per ton or a total of ¥1,389,810 in the determination of taxable income between the calculation of the taxpayer and taxation authorities. The taxpayer considered this decision unreasonable and instituted a suit at the Tokyo Local Court against the Tokyo National Tax Bureau for annulment of the administrative decision, stating that:

“The object of the Income Tax Law (which was effective before the revision made on March 31, 1950) to authorize a deduction of purchase costs as necessary expenses from revenues is to make possible the recovery of capital for the smooth continuance of business —, therefore, the interpretation of costs in case of the fluctuation of currency value shall be in harmony with the spirit of legislation”.

Against this, the Tokyo National Tax Bureau made the plea that:

“The cost of purchase stipulated in Clause 2, Article 10 of the old Income Tax Law was codified, following the original cost principle in

the theory of accounting; the law rejected appropriating profits through appraisal in case of a price advance, and adopted the realization principle that a appreciation of assets is not a profit and that the profit is realized only when sales are effected. Needless to say, there is a serious question that the tax assessment on profits from the sale of assets during the inflation would result in taxing on nominal income. As the Income Tax Law adheres to the original cost principle, legislative steps to revise this principle in the Income Tax Law are necessary, if the taxpayer was to be relieved from tax assessment on nominal income during inflation. However, such relief regulations were not inserted in the Income Tax Law from the viewpoints of tax assessment technique and national revenue.

Therefore, the original cost principle has not been changed at all as regards purchased goods and raw materials provided in Clause 2, Article 10 of the old Income Tax Law. Moreover, it is implied in the Income Tax Law that tax assessment on nominal income is inevitable. For these reasons, the tax assessment in this case could not be considered illegal".

The case was decided against the plaintiff on the following grounds:

"The plaintiff insists that steel frame materials used in 1949 were purchased in 1944, before the termination of the war, at ¥300 per ton, and evaluated at ¥2,000 per ton in the property tax returns of March 1946, the same value as the controlled price prevailing at that time; as the controlled price of steel frame materials in the fiscal year 1949 was ¥15,000, the cost of materials provided in Clause 2, Article 10 of the old Income Tax Law (effective before the revision of March 31, 1950) does not imply the price prevailing at the time when the property tax return was submitted in 1946, but must be the controlled price, ¥15,000 which was revised in the fiscal year 1949, following a decline in the currency value; consequently, ¥12,000 per ton which the plaintiff charged against the said steel frame materials should be deducted from sales revenue as purchase cost (some reduction being made from the controlled price of ¥15,000 because these steel materials were stocks on hand).

The advance in the controlled price of steel frame materials from ¥2,000 in 1946 to ¥15,000 in 1949 was attributed to a decline in the currency value due to inflation, and the increase of the controlled price is not considered to have been greater than the depreciated rate of money. Therefore, the owner of goods could not be said to have obtained a substantial profit from the price advance of goods in his possession (underlined by the writer). The plaintiff's stock, which was held from 1946 when it was quoted at ¥2,000, was delivered at ¥12,000 in 1949. The difference ¥10,000 per ton was caused by the price advance due to a decline in the currency value and must be regarded as nominal income but not as substantial income. From this point of view, the tax assessment on such nominal income seems to be unreasonable.

However, 'cost of purchased goods' stipulated in Clause 2, Article 10 of the old Income Tax Law means the original cost, and it cannot be considered that an advance in prices of the goods in possession, which is due to a decline in currency value, naturally brings about a revision of costs. The law adopts the principle that profits from a price advance are not the object of taxation, but taxes are assessed on profits which are realized through the sale of goods. Consequently, the above difference of ¥10,000 resulting from the delivery of steel frame materials at ¥12,000 per ton must be regarded as income provided in Article 10 and No. 9, Clause 1, Article 9 of the old Income Tax Law. Originally, the reason for the authorization in the law of deducting original cost from revenue as necessary expenses is that the deduction of purchase costs is regarded as proper in the determination of profits. Needless to say, the law did not take into consideration the estimated purchase cost in future. Consequently, the plaintiff should not confound purchase cost with prices necessary to replace the same commodity. The difference ¥10,000 may be considered as nominal profit, and tax assessment on such profit could not be the object of the law. However, the law could not foresee that the original cost would be revised following a decline in currency value especially in abnormal inflation.

As a legislative measure to remedy the above difficulty resulting from inflation, there was the Assets Revaluation Law which aimed at the revaluation of fixed assets. But the movables as merchandise, raw materials, etc. have been placed outside this law, as these movables are usually transacted during a short period, contrary to fixed assets, the difficulty arising from tax assessment on their nominal profits is comparatively small, even though the taxable relief through revaluation is not granted to them. Moreover, the revaluation of movables is nearly impossible due to technical difficulties (underlined by the writer). Therefore, although the Assets Revaluation Law was enacted, it is not proper to consider that the Income Tax Law grants the same relief as regards merchandise, raw materials, etc. too, even if legislative measures to meet abnormal conditions are not taken, and to conclude that the meaning of 'cost' in Clause 2, Article 10 of the old Income Tax Law shall be revised, following inflation, in conformity with market prices or controlled prices prevailing at the time when revenue is realized.

It is undeniable that tax assessment in this case is extended over nominal income, but it is not illegal, though unreasonable."

The judgement is clear in its statement and involves no doubt. The decision explains that "it is undeniable that tax assessment in this case is extended over nominal income, but it is not illegal, though unreasonable", because the cost of inventories in the old Income Tax Law means the actual purchase cost and no legal measures have been taken to remedy the effects

of a depreciated currency on inventory costs in the determination of income.

Two points may be mentioned from the theoretical standpoint of the accounting, however, as regards the opinion of the court concerning the business income during the inflation. These points have been underlined as above by the writer. The one is that "the advance in the controlled price was attributed to a decline in the currency value due to inflation and the increase of the controlled price is not considered to have been greater than the rate of decline in currency value. Therefore, the owner of goods cannot be said to have obtained a substantial profit from the price advance of goods in his possession". From this short phrase, it can be understood that, apart from the interpretation of the text of the law, the court conscientiously distinguished *stabilized cost*, that is the original cost adjusted by the general price index, from *replacement cost*, and supported the principle of maintenance of money capital on the theoretical basis of Stabilized Accounting, according to which, unless replacement cost is larger than stabilized cost, the excess part of replacement cost over original cost does not constitute profit.

The other point is the court's opinion that "as merchandise, raw materials, etc. are usually transacted during a short period, contrary to fixed assets, the difficulty arising from tax assessment on their nominal profits is comparatively small, even though the taxable relief through revaluation is not granted to them." This is an important point which is liable to lead to misunderstanding as regards the formation of imaginary profits causing by inflation. Several words will, therefore, be given below.

When an enterprise prepares a profit and loss account in a period of inflation on the basis of historical costs on the postulate of constant value of money unit, imaginary profits will arise from the depreciation charges of fixed assets, inventory charges and wages paid and other cost factors. In this case, the degree of imaginary profits is different according to the ratio of cost factors in total cost of finished goods in normal years when prices are stable. Generally speaking, in commerce and in manufacturing industries, the ratio of depreciation charges of fixed assets to total cost of finished goods is rather small, whilst inventories turn over several times during one accounting year, involving each time imaginary profits, which reach a heavy sum at the end of the year. The same applies to imaginary profits from labour charges. Under the post-war inflation in Japan, imaginary profits in large-scale enterprises employing large number of workers seem to have been most pronounced through frequent increase of wages. Enterprises where imaginary profits arising from fixed assets occupied a leading position were limited, I think, to several industries such as electric power and railway transportation.

Since the revaluation of fixed assets became an important problem after the violent inflation, as seen in the above legal case, the insufficient depreciation of fixed assets is often considered as the largest factor of the depletion

of capital caused by tax assessment on imaginary income. But according to my opinion, this view is not right in full sense. Although imaginary profits arising from other cost factors disappeared or declined following the stabilization of prices, depreciation alone remained to produce imaginary profits; under this circumstance, in order to lighten the burden of tax on business income, the fixed assets revaluation has been authorized by the tax law.

Tax assessment on imaginary profits in the above legal case is a typical example of economic suffering which was to be shared by all Japanese industries under the inflation after the War II, from the national standpoint. But it is undeniable that in the above judicial case the tax assessment had destructive effects upon the business of the taxpayer.

—Written in Oct., 1953—

CRIMINALITY IN JAPAN BEFORE, DURING AND AFTER THE WAR

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I. *General Observation*

In the statistical survey of criminal phenomena, the starting point of the question, so far as the method is concerned, is what sort of data is to be taken as the subject-matter. It is right, of course, that for a juristic study, the figures of decisions in the final instance should be taken as the standard data; but for a study of empirical science, the number of cases as they arise in society should be taken if possible. If this be unavailable, the number of arrests or the number of persons arrested may be used instead. Many students use the figures condemned in the first instance, but such figures are not immediate enough for the criminal phenomena which actually arise in the community. From this point of view, the number of cases as they arise in the community is to be taken as the data of survey.

But then the increase and decrease of population must be considered. If the number of cases arising in each year as against the number of population is ascertained, the influence of population may be eliminated. In this case, the next question is, what sort of population should be taken as the object of inquiry? If the population only of responsible age (14 years and upwards) is taken without considering the total population, it would be more rational, according to some experts. But this has little relevance to the Japanese judicial praxis, for in this country there is also a Juvenile Law. The juveniles, even though they are 14 years and above, are subject to this Law (Until 1948, the law covered the juveniles under 18 years and after 1949, the juveniles under 20.). If, therefore, these juveniles should commit crimes, they will not always be punished; hence their cases will not necessarily figure in the criminal statistics.

Even if those under the responsible age are excluded, there still remains a question, namely whether the male and female populations should be lumped together. In all countries, men are much numerous than women in the criminal statistics which tendency is more pronounced in this country. During a war, when a great change takes place in the male internal population, this fact must be sufficiently taken account of. There will be then an extraordinary decrease in the male population on the one hand and an

natural increase in the female population on the other. Where the male population alone changes a great deal, as in war-time, special significance attaches to this matter. In the criminological phenomena, the decrease in the male population in such context will have about ten times the significance as the increase in the female population would have. It will be a one-sided method to lose sight of this fact and to consider only the population of the responsible age and upwards. However, the ten times above suggested is the writer's own view without international recognition for it; the use of such method in calculation, moreover, will render general understanding difficult, besides being inconvenient for purposes of comparison with foreign data. I will, therefore, return to the naive method, leaving the responsible age and the difference of sexes out of consideration and also without taking into account those who were out of the country on war service and for other reasons. The population thus defined, that is, the internal population will form the subject matter of this statistical study. This population, according to the estimate of the Welfare Ministry's Institute for the Study of Population Problems, is as given in Table I.

When the figures of crimes for each year, as shown in Tables from I to XI, are divided by the number of population for the respective year, the result will give the rate of crimes to population, which must rise and fall

Table I.

Year	Total Population (including persons under 14)	Responsible Population (excluding persons under 14)
1935	69,304	45,106
1936	70,220	45,815
1937	70,989	46,378
1938	71,207	46,521
1939	71,554	46,811
1940	72,013	47,176
1941	73,204	48,146
1942	73,806	48,582
1943	73,735	48,332
1944	72,504	46,331
1945	72,351	46,729
1946	78,303	53,234
1947	78,101	52,267
1948	80,217	53,528
1949	81,598	54,297
1950	83,158	55,518

for each year. The result of calculation so made indicates, however, no appreciable difference from the result obtained by using only the actual number of crimes (Compare the actual figures of cases arising and the rate to population, Table II.). Speaking of the trends as a whole, the two results are practically the same, because the increase and decrease of population, as compared with the rise and fall in crimes, are extremely slight. In this statistical survey, therefore, the rate of crimes in relation to population is left out for the sake of economy in space. Table I shows the increase and decrease of internal population and Table II that of the Criminal Code offences considered as a whole, other Tables giving the actual number of crimes of different categories. By so doing, it will be seen that the increase and decrease of population, in comparison with the rise and fall in crimes, are so extremely small as may be negligible for all practical purposes. As, however, the actual figures of different crimes are given, the reader, if he is interested enough, may calculate for himself the rate of crimes in relation to population.

First of all, the Criminal Code offences will be surveyed as a whole. It will then be seen that the number of cases that arise and the number of cases under arrest are close to each other both in the increase and in the decrease (Table II). The general trend, which had its peak in 1935 and

Table II.

Year	Crime		Arrests	Arrests per cent of total crimes
	Cases	Cases per 100,000 population		
1935	1,528,188	2,205	1,464,989	96%
1936	1,306,902	1,870	1,212,652	93
1937	1,221,699	1,722	1,094,869	90
1938	1,243,635	1,764	1,122,775	90
1939	1,027,845	1,438	893,001	86
1940	1,026,955	1,427	862,290	84
1941	922,526	1,260	771,653	83
1942	890,331	1,207	691,314	78
1943	979,336	1,325	788,069	80
1944	905,836	1,247	709,596	78
1945	711,596	984	472,853	66
1946	1,387,080	1,770	803,264	58
1947	1,386,020	1,775	697,585	50
1948	1,603,265	1,995	811,907	51
1949	1,603,048	1,965	925,996	58
1950	1,469,662	1,770	999,709	68

which was declining even before the war, showed a decided fall in 1938, the year immediately after the outbreak of the Sino Japanese Affairs. However, in 1943, when the fortunes of the war were beginning to turn against Japan, a slight increase in crimes was registered, and in 1945, when the war ceased, the bottom was touched. In 1946, the year immediately after the war, however, an abrupt increase in crimes was recorded, and the number for 1948 exceeded even the highest number before the war, but again in 1950, the figures showed a sharp decline. For 1945, a large part of the data was lost on account of the confusion following the defeat in the war; therefore, the actual number for that year, it is believed, was much larger than the figures appearing in the statistics.

The general trend above is also observed in respect to the figures of those who were condemned in the first instance. It is necessary here to direct attention to the figures of arrests. These figures may be more or less inflated out of the ambition for "record" of those who were responsible for the arrests; these figures, therefore, cannot be accepted at the face value. But still in the first ten years of the *Shōwa* era (the era began in 1925), an extremely high rate of arrests was recorded, but this began to decline after 1936 through the war years until 1949, when the trend came to be reversed. In the war years, there was a fall in the police personnel for making arrests due to the war service and other reasons. Therefore, it is presumed that no small percentage of the crimes that arose escaped arrest. Consequently, the crimes that arose were in all probability much larger in number. Even without going to this extent, the decline in the capacity to make arrests accounted a good deal for the difference between the number of crimes that arose and the number of arrests.

The difference between the figures of crimes and the figures of arrests became more striking after the war. While on the one hand the capacity to arrest was being restored by the release of the police force from the war service, there were on the other hand an amendment of the Criminal Procedure Law, a reconstruction of the police system, and an abrupt change in many institutions of Japan, all combined to reduce the capacity to make arrests.

II. *Crimes against Interests of the State and Community*

Of the crimes against the interests of the State (Table III), those with the specific significance will here be mentioned:

(1) Offences against the Imperial Family. These crimes, during the war as compared with before the war, made an increase to a greater or less extent, which fact will perhaps reflect the policy for the period of procuratorial authorities. The statistics give the cases as they arose, but these

figures represent the offences as recognized by the said authorities and do not necessarily indicate that the crimes of this description sharply increased in war-time. During the war, the authorities, it is thought, treated trifling cases as if they were real offences; hence the increase in the criminal

Table III.

Year	% against the family of the state	Crimes against internal safety of the state	Crimes relating to foreign aggression	Crimes relating to international intercourse	Obstructing the performance of official duties	Prisoner's escape	Harbouring offenders, etc.	Perjury	False accusa- tion	Abuse of official authori- ty	Bribery
1935	20				741	61	316	356	807	118	3,089
1936	39			1	858	46	123	386	619	129	4,471
1937	28			1	479	46	111	305	633	250	2,469
1938	61			1	397	41	89	277	403	46	2,365
1939	66				373	28	64	210	264	29	1,774
1940	42	5			299	42	81	174	310	17	2,128
1941	60				286	41	99	156	338	35	2,722
1942	0				232	26	189	112	225	45	3,299
1943	90				181	53	145	82	182	19	6,166
1944	79				148	67	139	41	161	17	3,273
1945	27	5	6	13	128	128	35	18	43	10	2,343
1946	3			1	495	326	51	23	188	19	1,403
1947				1	673	368	86	36	159	49	2,489
1948					1,552	445	288	59	154	251	4,119
1949					2,617	498	368	98	235	225	8,941
1950					2,938	419	402	73	265	83	5,363

statistics, these statistics include perhaps crimes which cannot be regarded as such except by unreasonable application of the law. This circumstance does not, however, appear in the statistics, but judging from the actual cases reported during the period, there is little doubt that there was some such circumstance.

(2) Crimes against the Existence of the State. Offences against internal safety of the state, offences relating to foreign aggression, and crimes relating to international intercourse are rare crimes in any case, but the offences against internal safety of the state occurred 5 times in 1945, offences relating to foreign aggression 5 times in 1940 and 6 times in 1941. Of the crimes relating to international intercourse, there were 13 cases in 1945, the year when the war ceased, 1 case in 1946, and 1 case in 1947. It will be noticed that the said crimes occurred rather frequently after or immediately after the war.

(3) Crimes against the Functions of the State and Local Public Entities. When the crimes of these categories, that is, the crimes of obstructing the

performance of official duties, crimes of prisoners' escape, harbouring offenders including suppressing evidence, perjury, false accusation, abuse of official authority, and bribery are considered as a whole, it is seen that only the three categories, crimes of prisoners' escape, crimes of harbouring offenders, and crimes of the abuse of official authority, showed little changed in the statistics until the close of the war (be it remarked, however, that the two categories of prisoners' escape and of harbouring criminals made a temporary increase before the war). All these categories made a sharp increase after the war. This abrupt increase in the crimes of prisoners' escape was due to relaxation of gaolers' supervision after the erroneous spread of human rights ideas. The sharp increase in the crimes of the abuse of authority is accounted for by the fact that while formerly a slight abuse of authority would not be treated as a crime, this came to be regarded as a crime on account of the strengthened sense of human rights, which fact had clearly the effect of increasing the crimes of this category in the statistics. When the actual individual cases of the abuse of authority are considered, it will be seen that many of these cases are trifling matters, this indicating the popular resentment against authority. However, for the increase after the war in the crimes of harbouring offenders there are no ready explanations.

The curve of these crimes was the lowest in 1945, the year when the fighting ceased, and has since been rising, but the cases of official corruption are an exception to this trend. In fact, bribery cases were pretty many before the war, and the number has not gone down to the pre-war level even after the war. There is an increase or decrease in this crime from year to year, depending, it is presumed, upon procuratorial policy. In any case, so long as economic control was in force, there was a high rate in this crime.

The war-time fall and post-war rise in the crime of obstructing the performance of official duties will perhaps require an explanation. The war-time fall is accounted for largely by the fact that the hot-blooded young men who often make themselves guilty of this offence were out of the country on war service, while the post-war rise in this offence may perhaps be explained by the same factors responsible for an increase in the crime for the abuse of official authority.

(4) (a) Crimes against the Interests of the Community. The crimes concerning riot, arson, fire caused by negligence, flood and water utilization, destruction of road and traffic, etc. (Table IV) will now be considered as a whole. After the war, riot began to occur on a large scale, and the number arrested made a large increase. In 1948, for instance, as many as 1,746 were arrested. Crimes in the two categories of arson and fire caused by negligence fell in war-time, but are now gradually reverting to the former level, though they are still less frequent. As to the cause, it is said that the objects to be destroyed were fewer after the war-time conflagrations and

that, because of the progress of inflation, the arson with the intention of taking insurance money has largely lost its meaning. But it is doubtful

Table IV

Year	Crime Riots	Arson	Fire caused by negligence	Flood and water utiliza- tion	Destruction of road and traffic
1935	15	2.262	12.843	194	919
1936	2	1.918	11.820	166	782
1937	2	1.598	10.907	214	860
1938	0	1.491	11.373	102	865
1939	2	1.312	11.707	140	643
1940	5	1.238	12.642	70	574
1941	14	1.064	9.872	70	502
1942	3	1.068	10.033	56	543
1943	9	1.113	10.158	46	558
1944	4	1.011	8.246	59	489
1945	5	553	6.711	11	365
1946	9	697	8.424	20	197
1947	6	807	9.333	13	215
1948	41	940	8.694	34	379
1949	3	1.395	8.837	53	1.683
1950	5	1.905	9.124	67	1.169

whether this explanation is correct. The crimes concerning flood, water-utilization, and destruction of road and traffic also declined in war-time but are now reverting to their former state. As the statistics show, the war-time fall and the recovery after the war are the common trend of those Criminal Code offences, and the tendency above noticed is believed to be a part of the general trend.

(b) Crimes of Money-Counterfeiting, Forgery of instruments, valuable Securities and Seals. These crimes will next be considered as the crimes damaging the credit of the community (Table V). The trend of these crimes agrees with the general tendency noted above; but for one reason or another, the crimes of forging instruments have not reverted to the position before the war. The crimes of money-counterfeiting decreased both during and after the war, reflecting the dearth of supplies in war-time and the decline in the value of currency in the post-war inflation, only that in 1946 these crimes showed a sharp rise. It is interesting to recall that in February, 1946, a new yen note was issued replacing the old yen note, and the male-

factor was quick to see the chance; hence the rise in that year in the curve of the crimes of this category.

(c) Crimes against the Public Hygiene (Table VI). As such crimes,

Table V

Crime Year	Money-counter- feiting	Forgery of instruments	Forgery of valuable securities	Forgery of seals
1935	1.578	16.817	1.587	3.245
1936	1.214	17.515	3.037	5.736
1937	642	12.237	966	2.809
1938	406	13.162	1.176	1.718
1939	315	10.842	965	718
1940	180	8.750	975	871
1941	94	9.673	774	717
1942	49	6.642	1.107	340
1943	68	4.909	444	445
1944	55	5.442	320	333
1945	84	2.269	206	61
1946	894	3.672	380	198
1947	147	4.120	219	310
1948	133	5.695	558	610
1949	68	6.492	1.233	699
1950	74	7.746	1.390	921

Table VI

Crime Year	Opium-eating	Pollution of drinking water etc.
1935	67	65
1936	15	44
1937	23	38
1938	16	33
1939	78	92
1940	1	96
1941	5	64
1942	134	55
1943	100	40
1944	19	25
1945	1	24
1946	11	37
1947	42	29
1948	5	24
1949	42	23
1950	6	34

there are offences relating to the eating of opium and offences relating to drinking water, but there is little to report regarding these crimes. The crimes concerning opium-eating fell in number after the war, but there is a special law for the control of narcotics, to which are subject many of such crimes, which are increasing in frequency. Only that the statistics for Criminal Code offences have not been increased in relation to opium.

(d) Crimes against Good Manners (Table VII). As the crimes belonging to these categories, the crimes of indecency, rape and bigamy, gambling and lotteries, abandonment of deceased person, etc. will now be treated as a whole. In war-time, the crimes concerning the sex declined in general, which fact may perhaps be ascribed to the fact that the young men were out of the country on war service, affecting the composition during the war of the population. But the crimes of rape increased during the war though not to such an extent as to affect the statistics of the sex crimes as a whole. Some of the German and Austrian criminologist ascribed the fall during World War I in the crimes of rape partly to malnutrition, but during the late war so far as our country is concerned, the same crimes increased in number for one reason or another. It is a plain fact that these crimes increased after the war. As a reaction of war-time repression, there was a

Table VII

Crime Year	Indecency	Rape etc.	Bigamy,	Gambling	Lottery	Abandon- ment of deceased person etc.
1935	2,439	1,598	401	47,512	9	437
1936	2,230	1,548	369	44,163	58	334
1937	1,817	1,286	340	39,647	9	277
1938	1,826	1,223	327	44,019	10	235
1939	1,562	1,134	426	63,693	3	187
1940	1,359	1,018	384	50,620	41	164
1941	1,691	1,159	269	54,848	11	153
1942	1,512	1,589	195	38,986	169	103
1943	1,294	1,624	212	63,809	8	126
1944	780	1,318	228	43,412	7	89
1945	333	650	52	29,435	3	29
1946	238	611	163	29,508	25	59
1947	290	863	201	28,133	16	38
1948	1,205	1,936	87	20,742	59	114
1949	1,473	2,732	27	14,960	10	181
1950	2,326	3,558	61	9,538	7	252

relaxation in this matter after the war, which was undoubtedly the principal factor; but it is presumed that the restoration of physical vitality, demobilization, and acts of foreign soldiers at least in the early stage of the Occupation had an evil influence upon good manners of the people. As crimes of gambling and lotteries are offences difficult of detection and arrest, the figures in this regard indicate procuratorial policy rather than ups and downs in the crimes themselves. In 1939, these crimes were the highest in number, but at that time, the Sino-Japanese affairs was in progress, and on that account procuratorial policy was tightened up in regard to these crimes, looking upon such offences as the acts of lawless elements on the home front. As a mirror of this policy, the statistics of these offences reached the peak. The increase of the same crimes during the late war had the same meaning; but after the war the figures of these crimes declined as a matter of statistics. With the Government itself issuing various lottery tickets, the general attitude of regarding such speculative acts as criminal offences largely disappeared, while procuratorial policy came itself to be relaxed. The figures given as arising do not indicate the extent of offences that arose actually in the community; for, as everybody knows, gambling acts of one kind or another abounded in post-war society. The figures as mentioned in statistics do not portray the real condition in the community.

The figures of crimes of abandonment of deceased person etc. show the same ups and downs as the Criminal Code offences in general, indicating a decline in war time and reverting to the pre-war figures after the war. In this respect, there is little to record.

III *Crimes against Interests of Individuals*

(1) Table VIII shows as a whole the five categories of the crimes of homicide, simple assault, infliction of bodily injury, infliction of bodily injury by negligence, abortion, and abandonment. The categories of homicide, simple assault, and infliction of bodily injury are alike to each other in their trend; all these crimes, which had been declining from before the war, continued the same trend in war-time, but have been reverting to the former position after the war. As for homicide, the crimes have just reverted to the pre-war position, but the crimes of simple assault and bodily injury have far exceeded the level before the war. The war-time decline in these crimes was due, it is believed, to the fact that the young men, who often commit these crimes, were out of the country on war service; while the post-war increase is accounted for by their return on demobilization, especially by the bloody and rough habits of war-time, which are the key-note, it is believed, of the phenomenon.

Crimes of inflicting bodily injury by negligence (including death caused

Table VIII

Crime Year	Homicide	Simple assault	Bodily injury	Injury by negligence	Abortion	Abandon- ment
1935	2,484	1,553	29,290	1,237	1,008	435
1936	2,491	1,282	27,556	1,413	913	430
1937	2,226	1,051	25,592	1,492	452	345
1938	1,957	873	23,115	1,203	531	330
1939	1,692	732	21,651	1,141	641	256
1940	1,513	586	18,221	1,134	464	257
1941	1,424	525	17,114	965	387	276
1942	1,175	405	13,414	886	241	232
1943	1,112	333	11,196	830	383	204
1944	933	205	7,885	717	294	217
1945	919	207	4,493	432	145	159
1946	1,791	410	8,427	659	145	429
1947	1,938	720	11,865	1,052	182	362
1948	2,495	5,796	21,432	2,523	639	437
1949	2,716	11,851	32,627	2,030	522	467
1950	2,892	19,730	42,769	1,787	465	554

by such injury) and the crimes of abandonment follow the settled type of war-time decrease and post-war reversion to the former position; these crimes, therefore, have nothing worth special description.

On the contrary, the crimes of abortion after a war-time decline rose sharply in 1948, but are declining again. After the war, there has been a wide spread of contraception; therefore, the need of abortion ought to be small, in spite of the decline in sex morality. At the same time, as our country is burdened with over-population, and we are under the influence of opinion urging abolition of the provision relating to abortion, the procuratorial policy on this matter has been considerably relaxed; consequently, the figures of abortion that appear in the criminal statistics are small in comparison with the number of abortions that actually take place. Notwithstanding this fact, the crimes of abortion much higher than the level of 1944 were reported for 1950. The extent of abortions that actually take place in post-war society is a matter of conjecture, but journalism places the number at a million, which is of course a rough indication. Legislation concerning this crime is isolated from the actual state of society; in this regard it must be said that the statistics conceal behind them a goodly number of unreported cases.

(2) Crimes against Freedom. Table IX treats of the crimes of unlawful

arrest and confinement, threat and coercion, abduction and kidnapping, violation of domicile peace, and secrecy violation.

The two categories of unlawful arrest and confinement, and threat and coercion have similarities with simple assault and bodily injury in the personality of the perpetrators, the movement of figures before and after the war showing extreme similarities. These crimes follow the type of war-time fall and post-war rise in figures, but in the case of unlawful arrest and confinement, and threat and coercion, the post-war statistics not only reverted to the pre-war position but far beyond it. The explanation for these phenomena will be about the same as that for simple assault and bodily injury. As for abduction and kidnapping, and secrecy violation, these crimes have again increasing after the war, but not to the extent before the war. There is apparently no particular reason for these phenomena.

The crimes of violation of domicile peace showed a trend all their own; for these crimes sharply rose in war-time. This had connection, it is believed with the crime of adultery. At that time, the Japanese Criminal Code still had a clause punishing as a criminal offence both parties to an act of adultery, the prosecution requiring a complaint from the husband, who, however, was away from home on war service and did not know of the

Table IX

Year \ Crime	Unlawful arrest and confinement	Threat and coercion	Abduction and kidnapping	Violation of domicile peace	Secrecy violation
1935	222	3,456	1,254	10,390	107
1936	199	2,950	1,079	10,445	58
1937	125	2,220	898	9,448	57
1938	148	1,971	806	9,495	52
1939	82	1,697	690	11,083	53
1940	78	1,337	648	8,696	46
1941	94	1,183	555	8,833	31
1942	55	869	341	12,027	45
1943	48	880	239	15,976	26
1944	54	461	131	14,507	44
1945	40	314	23	6,949	7
1946	254	1,017	100	2,599	12
1947	80	1,538	62	2,604	12
1948	128	3,104	143	4,283	20
1949	234	4,144	360	7,719	51
1950	357	6,373	457	10,076	45

misconduct of his wife; but if he knew, there was still a difficulty in the way of communication, etc. So the offenders of this crime were often overlooked unpunished. Infidelity behind the back of the husband was, however, not to be tolerated on the home front in war-time. In order to circumvent the difficulty attending fulfilment of the conditions of prosecution on complaint, the procuratorial authorities resorted to a make-shift, pretending that the adulterer had violated the domicile peace of another person. This was the chief reason, it is believed, that the crimes increased during the war time. According to our impression received in everyday life, it was very clear that adultery much increased during the war time, and it is natural to conceive that the longer the war continued, the more the adultery increased. As a matter of statistics, however, the peak was reached in 1943, after which date there was some fall in figures. Anxious of the effect on the morale at the front, procuratorial policy was gradually modified in favour of a policy to act only in glaring instances. Hence a decline in the figures of adultery, but this conceals a goodly number of unreported cases.

(3) Crimes against Reputation, and Credit and Business.

Table X gives the statistics of these two categories. These crimes belong to the type which declines in war time and reverts after the war to the position before the war. There is little to be said on these offences.

Table X

Year \ Crime	Slander and libel	Offences against credit and business
1935	1,750	885
1936	1,358	726
1937	1,178	545
1938	1,017	403
1939	849	403
1940	627	312
1941	522	159
1942	415	118
1943	317	140
1944	194	228
1945	61	30
1946	234	97
1947	387	103
1948	605	370
1949	854	550
1950	938	666

(4) Crimes against Property.

Statistics of the crimes of theft, robbery, fraud, extortion, embezzlement, abuse of confidence, offences relating to stolen objects and injury to property are given in Table XI.

Of these crimes, only the crimes of injury to property is plainly not a mercenary offence. These crimes are similar to the simple assault in respect of the personality of offender. And as might be expected, in the annual increase or decrease of these two categories of crime their trends approximate to each other, decreasing in war-time and sharply rising after the war, now far above the pre-war level. As to the falling trend in war-time, the phenomena already appeared pretty clearly during the Sino-Japanese Affairs.

Theft, the typical crime against property, fell, though slightly, both at the commencement of the Affairs and at the beginning of the Pacific War, but had almost recovered the pre-war level toward the end of the war. The increasing tendency, however, commenced with the war's end and the figures rose with alarming rapidity. The principal cause thereof was the extreme shortage of supplies as a result of the prolonged war. Particularly the acute shortage of food was responsible for these phenomena,

Table XI

Crime Year	Theft	Robbery	Fraud	Extortion	Embezzlement	Abuse of confidence	Offences relating to stolen objects	Injury to property
1935	674,893	2,215	371,317	32,173	250,960	9,748	16,425	2,733
1936	648,860	1,975	240,305	14,329	211,626	5,381	16,194	2,361
1937	633,534	1,930	217,444	9,589	190,655	7,145	15,695	2,044
1938	634,341	1,461	244,057	8,712	185,208	4,463	23,027	1,736
1939	554,237	1,279	157,285	7,866	144,291	2,014	17,648	1,507
1940	573,225	1,232	181,177	7,608	114,314	2,255	17,580	996
1941	554,143	1,148	111,629	6,360	97,415	1,550	16,700	907
1942	587,616	1,390	82,695	5,373	91,454	1,374	12,507	1,175
1943	649,367	1,210	94,663	5,246	75,885	2,217	18,341	482
1944	660,842	1,258	67,195	5,677	51,017	2,445	18,395	302
1945	561,537	1,474	33,574	3,319	38,115	348	11,312	185
1946	1,155,392	9,120	84,101	11,205	31,397	540	26,453	500
1947	1,141,294	9,186	90,279	15,283	34,801	618	24,006	1,270
1948	1,246,445	10,854	133,666	25,691	47,087	1,391	39,713	2,688
1949	1,165,605	8,780	161,047	29,550	60,296	2,242	45,879	4,851
1950	782,341	7,821	187,528	32,740	65,616	2,258	38,234	6,559

as may be seen from the frequent theft committed on the vegetable gardens attached to the houses. The shortage of food led to psychological tension even within the families themselves, and was the cause not infrequently of murder being committed. As regards other supplies besides food, there were many instances of theft, for which dearth was responsible. After the war, however, with reviving economy, production increased; and as the acquisition of supplies became easier, cases of such a kind of theft became rare. These facts are an eloquent indication that such cases are environmental in character.

Other crimes against property, that is, the three categories of fraud, extortion, and abuse of confidence exhibit the same trend, declining in war-time and increasing after the war; but these crimes have not yet reverted to the pre-war level.

The offences relating to stolen objects makes the same ups and downs, on the long view, with the theft above mentioned, but the decrease of this category of crime in war-time was more slight than that of theft, perhaps because the second-hand articles in general rose in price, being affected by the want of supplies and especially the need of military supplies; hence such a professional mercenary crime was little affected by the war situation.

Extortion and robbery are no mere mercenary crimes, but possess factors common with threats and coercion, and simple assault. In this sense, extortion and robbery, as contrasted with theft and fraud, might be expected to show the same ups and downs with threat and coercion, and simple assault. What was the statistical result? The two categories of extortion and robbery made a fall in war-time, but sharply increased after the war; robbery in particular rose after the war nearly to ten times the number for the year 1941, that is, five times the number for 1935, which was the highest before the Sino-Japanese Affairs. These trends exhibit the same type of curve as the crimes of simple assault, and threat and coercion. However, extortion did not increase so prominently as robbery after the war as compared with the pre-war figures, but, it shows the highest after the war, excepting for the year 1935, which shows figures approximating to those for 1950, the same type of curve is clearly shown as simple assault, and threat and coercion.

IV *Conclusions*

The Criminal Code offences as a whole declined in war-time, reaching the lowest point in 1945, and began to rise after the war, reverting roughly to the pre-war period. The declining trend, however, appeared even before the Sino-Japanese Affairs. Looking over each categories of crime, we see that many of the crimes show the same curves as the Criminal Code offences as a whole, but some exhibit particular aspects, which will be noted in the

following paragraphs.

1. The crimes which increased during the war were the offences against the Imperial Family and the offences of violation of domicile peace. With respect to the former, procuratorial policy was tightened under the influence of ultra nationalism, the result being that the figures of this category rose; while as regards the latter, the figures increased, reflecting, as has already been explained, the unfidelity on the part of the wife after the husband was away from home on war service.

2. The cases of bribery, which were increasing before the war, rose in figures in the post-war period. The principal explanation is that with the increase of economic control, the sphere of official authority became widened, hence greater temptation.

3. In the post-war period, a number of crimes have made a prominent increase, attracting much attention. After the war, the social phenomena associated with foreign relations have become manysided, and the crimes relating to international intercourse, which were rare before, have appeared pretty often, and with the strengthening of the ideas of human rights, various forms of prisoners' escape, abuse of official authority, obstruction of the performance of official duties, riots, etc. have greatly increased. The crimes of harbouring offenders (including the suppression of evidence), though they cannot be treated as originated from the same cause as the preceding, have also sharply increased. In post-war moral decadence, crimes concerning the sex also rose in figures. The post-war atmosphere being a continuation of the wild manners of war, the crimes of violence (simple assault, bodily injury, injury to property and unlawful arrest and confinement) have sharply risen in figures. With the hardship of life, crimes from poverty or greed have multiplied. The theft and the offences relating to stolen property, etc. have multiplied. Also the crimes of robbery and extortion, coupled with simple assault and threat and coercion, have made a noteworthy increase after the war. These crimes, which fell in war-time, have not only reverted to the old level but far beyond it.

4. The crimes which decreased both before the war and after is the money-counterfeiting, the cause of this phenomenon being the currency depreciation. But this crime made a sharp increase as an exception, when the old yen was replaced by the new, there being at that time an extreme shortage of currency.

5. The crimes which made a singular decrease after the war are the offences of abortion and gambling. These crimes have certainly fallen statistically, but this does not correspond to the realities. The facts of abortion and gambling, on the contrary, have greatly increased. The former comes, consciously and unconsciously, from the general desire for a restricted population after the defeat in the war; while latter is stimulated, directly or indirectly, by the lotteries of various descriptions issued by the Government

in order to releave finance. From similar considerations, the policy of control has been relaxed. The cases are therefore rather rare that enter into statistics.

DEVELOPMENT OF THE STUDY OF GREEK PHILOSOPHY IN JAPAN

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Introduction

It is a well known fact that since the 6th century Japanese philosophy has been formed on the national spirit and moral sentiments of the country, by combining Buddhism and Chinese philosophy, especially Confucianism, as the most important ingredients, just as modern European philosophy has been fostered by Greek philosophy and Christianity. Consequently, traditional Japanese philosophy was in many cases synonymous with Japanized Buddhism and Confucianism.¹ It was only since the latter part of the 19th century that European philosophy began to have serious influence and to gradually take the place of the former two ways of thought. Christianity was introduced to Japan by Francis Xavier, a Spanish missionary, in 1549, and being welcomed by the upper classes and general populace of the period, became a powerful religious movement. However, it was soon suppressed because of political reasons, and after dreadful tragedies with many martyrs, it completely disappeared in 1638.² Therefore, Scholastic philosophy which was the doctrinal support of Christianity in Europe of that period, hardly became known to this country. Since that time, only technical knowledge such as surveying, navigation, shipbuilding and the natural sciences such as astronomy, physics, chemistry, and especially medicine and pharmacy were brought into this country from Europe by merchants from Holland which was the only country permitted to trade with Japan at that time.

The coming of M.C. Perry, the American commodore, in 1853, of which the centenary was celebrated in great splendour this year, forced the

¹ Cf. T. Inoue; *Die japanische Philosophie in Die Kultur der Gegenwart*. Teil 1, Abs. 1. Allgemeine Geschichte der Philosophie. Hrsg. v. P. Hinneberg. Berlin und Leipzig 1909. M. Anezaki; *Quelques Pages de l'Histoire Religieuse du Japon*. Paris 1921. W. E. Griffis; *The Religions of Japan from the Dawn of History to Meiji*. New York 1895. P. L. Conchoud; *Japanese Impression, with a Note on Confucius*. London 1921. G. L. Dickinson; *An Essay on the Civilization of India, China and Japan*. London 1914. P. S. Reinsch; *Intellectual and Political Currents in the Far East*. Boston 1911. K. Rothgen; *Staat und Kultur der Japaner*. Leipzig 1907. I. Nitobe; *Japan, Some Phases of Her Problems and Development*. London 1931.

² Cf. C. Otis; *History of Christianity in Japan*. 2 Vols. 1915. E. W. Clement; *Christianity in Modern Japan*. Philadelphia 1905. H. Haas; *Geschichte des Christentums in Japan*. Tokyo 1902. Henrion Baron; *Histoire Generale des Missions Catholiques depuis le XIII^e siecle jusqu'a nos Jours*. Paris 1847.

Tokugawa shogunate, then dictating Japanese politics, to abandon its policy of seclusion. As the result of this change in the political situation, *Bansho Chōsho* (the Institute for the Western Studies) was established in 1856, for the study of Western culture and the translation of scientific books in all fields, which later became the foundation of Tokyo University. At the same time, Yukichi Fukuzawa and other brilliant scholars accompanied diplomatic missions which were sent to Europe and America, deepened their understanding of European civilization and introduced it to Japan, thus contributing to its dissemination.

The first great contribution in introducing Western philosophy to Japan was made by Amane Nishi (1829-1896).³ As assistant professor at *Bansho Chōsho*, he went to Holland together with his colleague, Shindō Tsuda, (1829-1903) and studied jurisprudence, economics, philosophy etc., under S. Vissering (1818-1888), professor of Leyden University. He was also influenced by the famous philosopher C.W. Opzoomer (1821-1892), and bringing his positivistic, utilitarian philosophy to Japan, became the forerunner of philosophic enlightenment in Japan. This tendency of thought was in harmony with the ethics of democracy and liberalism which aimed at *the greatest happiness of the greatest number*, and it provided the theoretical basis for the political movement which overthrew the feudal Tokugawa shogunate and made the Meiji restoration successful. Nishi not only translated J. Haven's *Mental Philosophy* and J.S. Mill's *Utilitarianism*, but created many appropriate Japanese words for the vocabulary of Western philosophy.⁴ Also in his encyclopaedic *Hyaku-ichi Shinron* (Theory of All-is-one Philosophy) 1874, written in the form of dialogue, he explains that "all theories are one in the end," and clearly sets forth the conceptual differences and significant inter-relationships between *Morals* in Oriental philosophy and *Politics* in Western philosophy, also *a priori* and *a posteriori*, *mental* and *physical* law.

Yukichi Fukuzawa (1834-1907)⁵, the enlightened thinker who is well-known as the author of *Gakumon no Susume* (Encouragement of Learning) 1871-76 and many other writings, made known "Western affairs" to the Japanese people which had been in the dark because of the long period of the seclusion, and by asserting the civil rights and freedom of the people, contributed to the spread of utilitarian thought in his age. Another scholar of the same period, Hiroyuki Katō (1836-1916), developed utilitarianism with an evolutionary tendency, following the thought of Darwin and Haeckel, and introduced this new theory from the standpoint of egocentrism and

³ *Nishi Amane Tetsugaku Chosaku-shū* (The Philosophical Works of Amane Nishi), edited by Y. Asō, with introduction by T. Inoue, Tokyo 1933.

⁴ For instance, the creation of the new Japanese word "tetsugaku" meaning "striving for learning" or "love of wisdom", for the Greek word *φιλοσοφία* is due to him.

⁵ *Fukuzawa Yukichi Zenshū* (The Complete Works of Yukichi Fukuzawa) Vols. 10, Tokyo 1926. Supplement Vols. 7, Tokyo 1933.

materialism with special emphasis on "the right of the strong".⁶ Chōmin Nakae (1847-1901), a radical materialist, belongs to the same school of thought, and while Fukuzawa mainly studied in England, and Katō in Germany, Nakae went to France and endeavoured to introduce French thought.

In Japanese, the word "Meiji" means, "peace after enlightened manner", and the so-called "Meiji period" (1868-1912) was, as its literal meaning, a *period of enlightenment* in Japan. The major thinkers of Europe who dominated the first half of this period were J. Bentham, J.S. Mill, H. Spencer, H. Sidwick, E. Darwin, E. Haeckel, J. J. Rousseau, A. Comte, Ch. de Montesquieu, whose ideas were characteristically utilitarianism, naturalism, individualism, and materialism. They were studied not only by university professors but also by statesmen and journalists, for they were directly connected with the political movement to extend civic rights and freedom.⁷

On the other hand, idealism had been cultivated even in ancient Japan by Confucianism and Buddhism as a practical attitude and religious outlook in life. The first scholar who added to this theoretical reconsiderations and systematized it after the method of Western philosophy was Shigeki Nishimura (1828-1902). In the preface of his *Shingaku Kōgi* (Lectures on Mental Philosophy) 1885, he says, "in this age, be it law, economics, ethics or political science, without the knowledge of *mental philosophy*, they are as a tree without roots or a river without source. Particularly, education which has recently become the subject of learning has made *mental philosophy* a necessary element. Since these are, as everyone knows, all *metaphysical sciences*, the mind should be their basis. But, even for *physical sciences*, such as mathematics, chemistry, physics, natural history and biology, it has become impossible to be conversant with them without knowing the gist of *mental philosophy*."

The establishment of independent *mental philosophy*, not merely as a psychology from the empirical point of view, but as the fundamental of all sciences, naturally reminds us of Kant, and at the same time suggests that the road to German idealism, making Kant a cult, was opened. Translations or expositions of various histories of philosophy attempted in this period helped to make German philosophy understood, which had until then sorely been neglected in comparison with English and French philosophy. Thus, *Doitsu Tetsugaku Eika* (Essentials of German Philosophy), Tokyo 1884, by Yosaburō Takekoshi, *Rigaku Kōgen* (Keys to Philosophy), Tokyo 1886, by Chōmin Nakae, and *Tetsugaku Kenteki* (A few Drops of Philosophy),⁸ Tokyo

⁶ H. Katō; *Der Kampf ums Recht des Stärkern und seine Entwicklung*. Berlin 1894.

⁷ Y. Asō; *Kindai Nippon Tetsugaku-shi* (History of Modern Japanese Philosophy) Tokyo 1942. H. Shimoide; *Meiji Shakai Shiso-shi Kenkyū* (Studies in the Social Thought of Meiji) Tokyo 1932.

⁸ The author of this book explains the meaning of this title as follows; "It is said that Thales, the founder of Western philosophy, made water the principle of the Universe. Accordingly, I hope that this book will become a few drops of that water."

1889, by Yūjirō Miyake, were all summarized translations from the histories of German and French philosophy, in which the systems and development of German philosophy from Kant to Hegel were rendered. They were useful in bringing the profound transcendental philosophy of Kant and the abstruse dialectic method of Hegel closer to the philosophical world of Japan.

Further, Ernest Francesco Fenollosa (1853-1908), an American—well-known as the introducer of Japanese fine arts—and the first professor of philosophy at Tokyo Imperial University which was established in 1877, delivered lectures on Kant and Hegel, as well as on Mill and Spencer, and endeavoured to synthesize the empiric philosophy with the rationalistic, viz. English philosophy with German philosophy on the basis of the evolutionary theory. Also, Ludwig Busse (1862-1902), successor of Fenollosa, who later became professor at the University of Königsberg, having a passion for Kant and Lotze, emphasized the necessity of research in the history of philosophy for students in the faculty of philosophy at Tokyo University from 1877 on. In 1894, Raphael von Koeber (1848-1923), a Russian of German lineage, was appointed as successor to Busse. He was deeply influenced by Schopenhauer and Eduard von Hartmann,⁹ and was a strongly religious and mystical character, teaching for about twenty years at the university. Greek and German philosophy were his favourite topics, and by his learning and personality he aroused the sincere interest of the students which became an important element in deciding the philosophical direction of Japan from that time on. The shifting of interest of Japanese philosophers from the English utilitarian philosophy of Mill and Spencer towards German idealism centering around Kant and Hegel, and further towards the Greek philosophy of Plato and Aristotle, was made decisive by Koeber. This was a general tendency of the Japanese philosophical world in the latter half of the Meiji period. Since the Meiji restoration, as the above outline shows, Japan endeavoured to absorb the spiritual culture of Europe, especially philosophy which was the core of it, as well as Western mechanical civilization, and this brought about gratifying results. In the history of the transplantation of European philosophy to this country, however, the 19th century was substantially a *period of enlightenment*, while the 20th century is the *period of research and assimilation*, during which time remarkable progress has been made. At the present moment, when the first half of this century is over, one dares say that the understanding of the Japanese people of European philosophy has reached the highest level that could be expected.¹⁰

We already have reliable Japanese translations of the complete works

⁹ R. v. Koeber; *Das Philosophische System E. v. Hartmann's* Breslau 1884. *Die Philosophie A. Schopenhauer's*, Heidelberg 1888. *Jean Paul's Seelenlehre. Ein Beitrag zur Geschichte der Psychologie*, Leipzig 1893. *Lectures on History of Philosophy*. 3 Vols. Tokyo 1894. *Kleine Schriften*. 3 Vols. Tokyo 1918 ff.

¹⁰ K. Tsuchida; *Contemporary Thought in Japan and China*. New York 1927.

of Plato, Kant and Nietzsche, and the publishing of those of Aristotle, Hegel, Kierkegaard is in progress. As for Descartes, Pascal, Spinoza, Leibniz, Fichte, Schelling, Schopenhauer, Locke, Berkeley, Hume, almost all the principal writings of these classical philosophers are already translated in Japanese, and many excellent studies on them have been published. The same can be said of such contemporary representative philosophers as H. Cohen, P. Natorp, W. Windelband, H. Rickert, H. Bergson, G. Simmel, E. Husserl, M. Heidegger, K. Jaspers, W. James, and J. Dewey. These translations and studies far surpass those of other countries in the East, in both quantity and quality, and it is not an exaggeration to say that they can be compared with those of European countries. However, it is not easy to impart in detail the philosophical works achieved by Japanese scholars during this half a century. In order to understand the present situation of research in European philosophy, I believe, it is necessary to differentiate at least the three fields which were mentioned above.

(i) The study of Greek philosophy, especially Plato and Aristotle.

(ii) The study of modern German philosophy, especially from Kant to Hegel.

(iii) The study of contemporary European philosophy, especially Neo-Kantianism, Phenomenology and Existentialism.

In this article, I wish to make several observations on the first subject.

I

The study of Greek philosophy in Japan may be considered as having passed through three stages, corresponding to the general tendency of research in the modern European philosophy in this country. First, the stage of using histories of philosophy written by eminent European scholars as manuals and understanding Greek philosophy second-hand. We may call this the *period of enlightenment*. Second, the stage of direct understanding from original texts. This may be called the *period of translation* and philological research. Third, the stage of philosophical study on the basis of such philological research in Greek philosophy. We may call this the *period of criticism* in the truest sense of the word and philological-philosophical study.

It is difficult to exactly determine at what period the *names* of Plato and Aristotle were first introduced to the Japanese; it may have been at quite an early period, for, as above related, with the coming of Christianity to Japan, it is quite probable that these esteemed names were known among Christians in this country.¹¹ However, even though this may be a fact, it is another thing to have knowledge of their philosophical ideas. Greek

¹¹ Y. Asō; *Kindai Nippon Tetsugaku-shi* (History of Modern Japanese Philosophy) Pp. 15-20.

philosophy was first introduced to Japan from Europe in the latter half of the 19th century, together with Western thought, for Greek philosophy is the fountainhead of Western thought, and it is impossible to discourse on the latter without referring to the former. Thus, it is quite natural that Nishi and other early scholars should often refer in their discussions to Thales and other Greek philosophers. But this was chiefly due to the narrative habit and convenience of explanation after the manner of Western scholars, and does not mean interest in ancient Greek philosophy itself which was still remote in their time. Their standpoint, as stated already in the introduction, was none other than utilitarianism and liberalism as the theoretical background for the political movement of the Meiji restoration and the following period. For instance, Nakae refers to Plato's theory of Ideas in his *Rigaku Kōgen* (Keys to Philosophy) in a political rather than philosophical sense.¹²

In 1882, Kenchō Suematsu delivered a lecture at a meeting of Japanese students in London under the title of *Girisha Kodai Rigaku Ippan* (Outline of Ancient Greek Philosophy), which he published the following year in Tokyo. Here, the theories of the Presocratic philosophers are briefly introduced and interpreted in terms of thought and diction of Chinese philosophy, comparing Socrates to Confucius, Plato to Tsu Su and Aristotle to Mencius. We may say, however, this is the characteristic and generally accepted way of interpreting Greek thought by the people of this period who had been reared by Chinese classics in their youth. Nevertheless, this could be called a *story* at most, but never a *history* of Greek philosophy.

The scholar who tried an academic approach to Greek philosophy and who first wrote a history of it was Hajime Ōnishi (1864-1899). In *Tetsugaku Zasshi* (Journal of Philosophy)¹³ Vols. VII-IX, 1892-94, he contributed a treatise entitled *Socrates-zen no Girisha Tetsugaku* (Presocratic Philosophy of Greece), in the preface of which he writes, "Among the works on the Presocratic philosophy of Greece written in Japanese, I believe my treatise is the most accurate and most detailed." We may assert that this treatise of his is noteworthy not only for its accuracy and detail, but also for its academic attitude in research; he takes up Greek philosophy as an object worth arduous study. With all these merits, the treatise is not free from the disposition of this period as will be seen from the author's statement;¹⁴ "What I describe is not from a close study of original texts, but is mainly based on the results of scientific research and investigation of historians of European philosophy to the present day. The scholar I have referred to most is E. Zeller. But without idly following one historian I have compared the

¹² C. Nakae; *Rigaku Kōgen* (Keys to Philosophy) Pp. 177-195.

¹³ The first issue of *Tetsugaku Zasshi* (Journal of Philosophy) was made in 1887, providing place for philosophical debate of leading philosophers and philosophical symposium of young talented scholars, and still now it is one of the most important philosophical magazines in Japan.

¹⁴ *Tetsugaku Zasshi* (Journal of Philosophy), Vol. VIII. p. 127.

theories of many and have stood by the one considered most reliable."

Later, Ōnishi wrote an enlarged and well-arranged *Seiyō Tetsugaku-shi* (History of Western Philosophy) 2 Vols. Tokyo 1895, from early Greek to modern philosophy, based on his lectures at the university. This was not a mere translation or adaptation of Western books, but a most reliable and detailed history of philosophy written by a Japanese, and it had many readers for a long time. However, the methodic standpoint which he took in his former treatise is also asserted here; the authorities preferred in his interpretation of the theories of the various schools are, so far as Greek philosophy is concerned, E. Zeller, P. Überweg, W. Windelband etc., not the fragments of the Presocratic philosophers, the dialogues of Plato or the "works" of Aristotle. The same criticism may be applied to Seiichi Hatano's otherwise well written *Seiyō Tetsugaku-shiyō* (Short History of Western Philosophy), Tokyo 1901, which has had many editions and is still often used by university students today.¹⁵

I must particularly dwell here on two other works which symbolize the enlightening character of this period. One is *Platon Zenshū* (the Complete Works of Plato) translated by Takatarō Kimura, 1930 ff.,¹⁶ the other is *Aristoteles Rinrigaku* (Ethics of Aristotle) with a running commentary by Genyoku Kuwaki, 1900. Kimura was the very first scholar in Japan to undertake the fascinating task of translating the dialogues of Plato into Japanese. In the preface to the work, Kimura enumerates his motives for translation, viz.: "that Plato's dialogues are of great use in promoting the knowledge and morals of our people, that they are extremely valuable to train our national spirit, that the learning of our people should become independent from subordination to foreign languages, that it is necessary to translate the classics of foreign countries into our language, and finally that they make possible the fundamental study of Plato from the original source." These reasons mentioned by Kimura, who was famous as a philosopher of national characteristics, are quite understandable from the enlightenment currents of thought of the period, but among them, the last is the most important. He says that, "I eagerly wish that our people would not merely be satisfied with piece-meal and make-shift books of narrow scope, such as short histories, summaries and outlines of philosophy by various writers, but casting off the attitude of having carried on research by means of such material, regard this as rubbish, and study the great thinkers directly from their original sources".¹⁷

¹⁵ *Hatano Seiichi Zenshū* (The Complete Works of Seiichi Hatano) Vol. 1, Tokyo 1949.

¹⁶ *The Complete Works of Plato*, translated into Japanese with introduction, analyses and running commentary by T. Kimura. 5 Vols. Tokyo 1903-1911. Vol. 1. *Charmides, Lysis, Laches, Protagoras, Euthydemus, Io, Meno, Euthyphro, Apologia Socratis, Crito, Phaedo, Symposium*. 1903. Vol. II. *Respublica, Timaeus, Critias*. 1906. Vol. III. *Phaedrus, Gorgias, Theaetetus, Sophista, Politicus*. 1908. Vol. IV. *Leges*. 1909. Vol. V. *Cratylus, Parmenides, Philebus, Hippias minor, Alcibiades I, Menexenus, Alcibiades II, Eryxias*. 1911.

¹⁷ *Ibid.* Vol. 1. Pp. 7-8.

Needless to say, his advocacy to understand Plato through his own writings and not through reports and summaries of other is quite correct. But his translation betrays his intention, because the text he used was B. Jowett's English translation (3rd edition) and not the original text of Plato. This English translation may have been "the newest and most correct" of that period, as understood by Kimura, but it is well known to be rather a free and not literal translation. To retranslate this into Japanese risks many dangers. In fact Kimura's Japanese translation contains many mistranslations and erroneous interpretations. Even if this were left out of consideration, what Kimura could impart by his translation was the Plato of Jowett and not Plato himself. In this respect, the complete works of Plato of Kimura reveals to us a merely enlightening character.

Kuwaki's *Aristoteles Rinrigaku* (Ethics of Aristotle) was written as one of the *Commentary Series of Representative Works on Ethics in Europe*. Among the three Ethics attributed to Aristotle, he took only the *Nicomachean Ethics* as the philosopher's own work, and attempting to comment on it, made a perfunctory explanation on the supreme good, ethical virtues, free will, intellectual virtues, justice, continence, friendship and pleasure. But the position of this Ethics in the development of Aristotle and the philological-philosophical difficulties contained in it were mostly disregarded. This is nothing less than proof that Kuwaki's book is a work representative of the enlightenment period.

II

In 1921, Tsutomu Kubo, a devoted disciple of the Philhellenist R. von Koeber, cooperating with Jirō Abe, both emeritus professors of Tōhoku University, translated Plato's *Apologia Socratis* and *Crito* from the original texts into correct and fluent Japanese, attaching a running commentary. This fact meant not only that a translation of Plato had happened to be published but also that the period of authentic translation had begun in the study of Greek philosophy in Japan. For following this publication, a translation of Plato's dialogues from the original was attempted with sufficient philological scrupulousness by many young proficient scholars, so that at the present time, we have come to possess trustworthy Japanese translations of all of Plato's works.¹⁸ Some of these can be ranked with those of the fore-

¹⁸ The important Japanese translations of Plato's works, with introduction and commentary are as follows: *Apologia Socratis* and *Crito*, by T. Kubo and J. Abe. Tokyo 1927. *Protagoras*, by K. Kikuchi. Tokyo 1927. *Gorgias*, by E. Inatomi. Tokyo 1930. *Meno* and *Euthyphro*, by T. Soejima. Tokyo 1948. *Euthydemus*, by M. Yamamoto. Tokyo 1942. *Phaedo*, by K. Kikuchi. Tokyo 1924. *Symposium*, by T. Kubo and J. Abe. Tokyo 1934. *Respublica* 1-IV, by N. Nagasawa. Tokyo 1949-1952. *Theaetetus*, by M. Tanaka. Tokyo 1938. *Parmenides*, by N. Nagasawa. Tokyo 1944. *Sophista*, by J. Shikano. Tokyo 1932. *Philebus*, by K. Gotō. Tokyo 1932. *Leges* I-VI, by M. Yamamoto. Tokyo 1946-1949. *Epistulae*, by M. Yamamoto. Tokyo 1944.

most European scholars in regard to textual exactitude, and scrupulosity of comment and expression. It is impossible to dwell on these in detail here. I wish to mention particularly, as representative of this period, the publication of the complete works of Plato by Shōzō Okada.¹⁹ He made a correct and readable translation using mainly *Platonis opera* rec. J. Burnet (Oxford classical texts), as the original. As with almost all translations of the classics—especially those of Plato and Aristotle—it may be possible to discern in Okada's translation mistranslations and omissions due to carelessness. However, we cannot appreciate too much his admirable efforts and passionate enthusiasm for Plato during twenty long years, starting with the *Meno* in 1933 and ending with the *Leges* and the *Epinomis* in 1952. This gigantic work contributed greatly to the infusing of Socratic vigour and wisdom as well as Platonic soul and method into the Japanese spirit.

The translation of Aristotle's writings is far behind Plato's. The first translation of Aristotle in Japan, as far as I know, is that of the *Poetica* by Kaichi Matsuura in 1924. Unfortunately this is far from a reliable translation.²⁰ The publication of the complete works of Aristotle in Japanese, based on the *Aristotelis opera* ed. I. Bekker (edition of the Berlin Academy), under the editorship of Tokuryū Yamanouchi and Takashi Ide, was planned in 1937,²¹ but till the present only about one third, that is, the *Topica*, the *De Caelo*, the *De Anima*, the *Parva Naturalia*, the *Ethica Nicomachea*, the *Politica*, the *Atheniensium Respublica* and the *Oeconomica*, have been published, while the translation of the other works is now in preparation, including the *Organon* which I am in charge of, and which will be

¹⁹ *The Complete Works of Plato*, translated into Japanese by S. Okada. Vols. 12. Tokyo and Kyoto 1942–1952. Vol. I. *Euthyphro*, *Apologia*, *Crito*, *Phaedo*, *Euthydemus* 1942. Vol. II. *Protagoras*, *Meno*, *Cratylus*. 1942. Vol. III. *Phaedrus*, *Lysis*, *Laches*, *Charmides* *Hippias minor*, *Io*, 1943. Vol. IV. *Symposium*, *Gorgias*, *Menexenus*. 1943. Vol. V. *Parmenides*, *Theaetetus*, *Hippias minor*, 1944. Vol. VI. *Philebus*, *Sophista*, *Alcibiades II*. 1944. Vols. VII–VIII. *Respublica*. 1948. Vol. IX. *Alcibiades I*. *Politicus*, *Amatores*, *Hipparchus*, *Theages*. 1949. Vol. X. *Timaeus*, *Critias*, *Minus*, *Cleitophus*, *Epistulae*. 1951. Vols. XI–XII. *Leges*, *Epinomis*. 1951–1952.

²⁰ The revised and enlarged edition of this translation published in 1949 is greatly improved and quite readable.

²¹ *The Complete Works of Aristotle*, translated into Japanese with running Commentary, by many scholars, 20 Vols. Tokyo (The starred volumes still remain unpublished). *Vols. 1–IV. *Organon*, by Y. Fujii. (*Topica* already has been translated by T. Yamanouchi and Z. Taga 1944). *Vol. V. *Physica*, by T. Kaneko. Vol. VI. *De Caelo*, by Y. Muraji 1952. *Vol. VII. *De Generatione et Corruptione*, *Meteorologica*, *De Munde*, by T. Tanaka. Vol. VIII. *De Anima*, by C. Takahashi 1937. Vol. IX. *Parva Naturalia*, by T. Soejima 1939. *Vol. X. *Historia Animalium*, by S. Shimazaki. *Vol. XI. *De Partibus Animalium*, *De Motu* and *De Incessu Animalium*, *De Generatione Animalium*, by K. Masuda and S. Shimazaki. *Vol. XII. *Metaphysica*, by T. Ide. Vol. XIII. *Ethica Nicomachea*, by S. Takata. 1937. *Vol. XIV. *Ethica Eudemia*, *Magna Moralia*, by S. Ishiyama. Vol. XV. *Politica*, by M. Yamamoto. 1951. Vol. XVI. *Atheniensium Respublica*, *Oeconomica*, by K. Murakawa. 1947. *Vol. XVII. *Rhetorica*, by T. Iwakura. *Vol. XVIII. *De Poetica*, by M. Kinoshita. *Vol. XIX. *Problemata*, by T. Ide. *Vol. XX. *Fragmenta*, by M. Tanaka. Besides the *Complete Works of Aristotle* and K. Matsuura's translation of *De Poetica*, I must also mention here the translations of *Categoricae* and *De Interpretatione*, by T. Ando, Tokyo and Osaka 1949, *Metaphysica* by T. Iwasaki, Tokyo 1942 and *Politica*, by I. Aoki, Tokyo 1937.

finished before long. Besides the translation of the original texts of Plato and Aristotle, the fact should be noted that many excellent studies of famous European philosophers, historians of ancient philosophy and classical philologists since the 19th century, for instance, H. Cohen, V. Brochard, H. Bonitz, C. Prantle, F. Brentano, and so on, have been translated and collected in *Tetsugaku Ronsō* (Philosophical Study Series).²² The translation of so many special studies on Greek philosophy into a foreign language is rarely heard of even in Europe and America. Though this is the result of the special circumstances of an East Asian country like Japan, where it is difficult to become acquainted with documents because of their scarcity, even in this respect one can perceive the zeal of this period.

The year 1921 became a memorable one by the publication of Seiichi Hatano's *Seiyō Shūkyō Shisō-shi* (History of Western Religious Thought), Vol. 1. (Greece). Hatano is generally recognized as the foremost philosopher on Religion and also a talented historian on philosophy in contemporary Japan. Being strongly influenced by R. von Koeber, he has been a constant admirer and lover of Greek thought all his life. The above work deals with Greek religious thought from Homer to the Sophists, and may be regarded as a history of Greek thought treated from the religious standpoint centering on the idea of God. For the history of early Greek philosophy is the development "from *mythos* to *logos*," in which the religious and philosophic were indiscriminately combined and of which the upholders were none other than poets and philosophers. This is evidently shown by the double meaning of *lógos*.

In consideration of this, one may assert that this book is one of the most worthy histories of ancient philosophy written in Japanese until the present time. However this evaluation of Hatano's work applies not to the *conclusion* it draws, but rather to the *method* or *process* taken to draw this conclusion. To be more particular, this book does not offer a new theory differing from the views already asserted by European scholars. For example, according to Hatano, the relativism of the Sophists does not signify as commonly interpreted, a denial of the recognition of absolute truth or destructive nihilism and pessimistic scepticism, relinquishing the pursuit of knowledge (*φιλοσοφία*), but on the contrary, an optimistic pragmatism and traditionalism of common sense. Therefore, they were actually "professors

²² *Tetsugaku Ronsō* contains the translations of the following treatises. No. 17. H. Cohen; *Platons Ideenlehre und die Mathematik* (1878), by S. Takata 1928. No. 20. V. Brochard; *Le devenir dans la philosophie de Platon* (1900), by Y. Kōno 1929. No. 24. Lutoslawski; *Sur une nouvelle méthode pour déterminer la chronologie des dialogues de Platon* (1896), by Y. Kōno 1929. No. 28. V. Brochard; *Sur le Banquet de Platon* (1906), by Y. Kōno 1929. No. 31. H. Bonitz; *Über die Kategorien des Aristoteles* (1853), by Y. Fujii 1930. No. 39. C. Prantl; *Über die Entwicklung der Aristotelischen Logik aus der Platonischen Philosophie* (1853), by Y. Fujii 1930. In addition to these series, the translations of the following works must be cited H. Bergson; *Quid Aristoteles de loco senserit* (1889), by T. Igarashi. Tokyo 1944. F. Brentano; *Vom der mannigfachen Bedeutung des Seienden nach Aristoteles* (1862), by T. Iwasaki. Tokyo 1933. J. Burnet; *Platonism* (1928), by T. Ide and K. Miyazaki. Tokyo 1941.

or public teachers" who trained people to be active and practical. His assertion attracted the attention of people in this country and gained their approval, but this interpretation had already been fundamentally established by Grote in his well-known book, *History of Greece*. Hatano's chief achievement, however, consists in the fact that he arrived at this conclusion himself in virtue of his study of the original materials of Plato, Aristotle and other Doxographers. To appreciate this more fully, one should compare this book with his *Seiyō Tetsugaku-shiyō* (Outline of History of Western Philosophy) written by himself just 20 years ago, or the above referred treatise of Ōnishi, *Socrates-zen no Girisha Tetsugaku* (Presocratic Philosophy of Greece).

In the same way, the proof of progress can be discovered by comparing the two complete works of Plato by Okada and Kimura.

Several years later, *Seiyō Tetsugaku-shi* (History of Western Philosophy) Vol. 1, 1929 by Takashi Ide and *Kodai Tetsugaku-shi* (History of Ancient Philosophy) Vol. 1, 1935 by Takezō Kaneko were published. The former, based on lectures at Tokyo University by the writer, deals with the biographies and theories of philosophers from the dawn of Greek thought to the Atomists. Though his description is rather vapid and prosaic, it seems to aim at being a faithful doxography as far as possible from the historical standpoint, much after the manner of Überweg's work. The latter is also a handy history of philosophy, endeavouring to interpret systematically the philosophical theories from Thales to Plato from the ontological point of view. However, as with Hatano's work, it is regrettable, that only volume 1 has been completed whilst later volume remain yet unpublished.

III

Wilhelm von Humboldt in the last passage of his *Über das Studium des Altertums, und des Griechischen insbesondere* 1793, makes the following assertion in regard to translation as one of the most useful means for the study of ancient Greece.²³ "For the writer who is translated, translation can have a threefold advantage: 1. Anyone who can not read the original by himself can learn about the writer; 2. It is useful for anyone who can read the original in understanding it; 3. It makes known the original previously to anyone who is going to read it and confides its manner and spirit to him. If one were to determine the importance of each of these advantages, according to the standpoint here taken, the first is the most insignificant; the second is more important but still small, for translation is a poor means for this very purpose; but the third is the most important

²³ *Wilhelm von Humboldts Gesammelte Schriften*. hrsg. v. A. Leitzmann. Berlin 1903. Bd. 1. Pp. 280 f.

advantage, because translation stimulates one to read the original and gives the reader support of the higher order." "The gaining of this last advantage must lead to esteem for the original, and so the highest advantage of translation is one which destroys the value of translation itself."

These three advantages of translation as cited by Humboldt are sufficiently convincing even though they are in fact indistinguishably blended together. He further goes on to say that "the describability of translation accordingly depends on these three advantages. Thus, as regards the first, the adaptation of the translated ancient writer to the minds of modern readers, the purposeful deviation from faithful translation is often required; as regards the second, faithfulness to word and letter is required and as regards the third, faithfulness of spirit and if I may say so, of the dress he is wearing."

These assertions by Humboldt are not without meaning for our study. The three stages in the study of Greek philosophy in our country correspond to the three advantages mentioned above. The enlightenment period required deviation from the original, the period of translation with philological research required the faithful rendering of words, and the period of criticism, coordinating philological and philosophical research, *inter alios*, the faithfulness of spirit. It goes without saying that these three stages of development, being so cited for convenience sake, the correspondence of these to the three advantages of translation is hypothetical. For, as the enlightenment period cannot be separated from the translation period by periodic divisions, the latter cannot be strictly distinguished by years from the period of criticism. However, in order to better understand the intentional development and the direction of the study of Greek philosophy in Japan, the present age, at least the past decade or so, may be called the period of criticism. Since the 20th century, Greek philosophy, together with German philosophy, has enchanted the minds of our young philosophers and has become their favorite subject of study. Thus, the study of Greek philosophy has made rapid progress, and rising beyond the level of mere introduction, adaptation or translation, many treatises and works worthy of the name of professional research have come to be published.

Greek philosophy which had been first transplanted to this country in the middle of the 19th century took root through the assiduous efforts of scholars extending over one whole century, grew into a foliaged tree and at last, I dare say, its branches are beginning to bear fruit. As it is impossible for me to discuss all the writings on Greek philosophy which have been made public to date, I wish to limit myself to commenting on several representative works which suffice to show the present stage of study.

On the Sophists and Socrates

At the regular meeting of the Philosophical Society of Kyoto on Novem-

ber, 1918, S. Hatano gave a lecture on the Sophists and Socrates, emphasizing the similarity rather than the difference of the two on the very point that the Sophists were "public teachers" who promoted the enlightenment of the Athenians, while Socrates was a *practical man* taking care of the souls of the Athenian youth, rather than a *theoretical man* as the forefather of the new "Begriffsphilosophie."²⁴ As already said, the same point of view was repeated in his *Seiyō Shūkyō Shisō-shi* (History of Western Religious Thought) 1921.

Since then the only monograph on the Sophists is Michitarō Tanaka's *Sophist*. Tokyo 1941. Tanaka, professor of Kyoto University, is one of the most able and leading figures among historians of ancient philosophy in contemporary Japan, and is wellknown by many writings in this field. At the beginning of his book, he says that "it aims at making clear what kind of persons they actually were who were branded with the bad name of Sophists in ancient times, what kind of age it was, and what kind of work they did, as seen directly by the author on the basis of original materials." No one can deny the historical significance and requisite role played by the Sophists in the enlightenment movement of Greece, with Athens as a centre, in the latter half of the 5th century B.C. Much has already been written about them by various historians of philosophy, but a historically correct and established valuation is hard to find. Why was the word σοφιστής which had been originally a term of respect, as examples used by the Seven Sages and early philosophers confirm, converted into a notorious name as seen in the use by Plato and Aristotle? Why did these persons who had prided themselves as teachers of virtue become sophistic and eristic? What was the relationship between rhetoric or eristic as methods of the Sophists and dialectic as the method of Socrates? These questions are discussed in his book quite clearly and convincingly, despite the modest announcement of the author.²⁵

As Socrates was first and foremost in contributing to the building up of the unrivalled position occupied by ancient Greece in the history of philosophy, a large number of treatises and books on this Athenian philosopher have been written by many scholars, according to their own views, in both Europe and America. Japan is not an exception. Among the various works on this subject written in Japanese,²⁶ here I wish to mention *Girisha no Tetsugaku to Seiji* (Philosophy and Politics of Greece), Tokyo 1934 by Takashi Ide, former professor of Tokyo University. This book is a collection of 7 articles, namely—the theoretical character of ancient physics; the

²⁴ *The Complete Works of S. Hatano*. Vol. III. Pp. 239-258.

²⁵ See my article, *Sophist Antiphon*, in *Shakai to Bunka no Shosō* (Some Aspects of Society and Culture) ed. by S. Uehara, Tokyo 1953.

²⁶ E.g. K. Miki; *Socrates*. Tokyo 1939. K. Gotō; *Socrates*. Tokyo 1936. E. Inatomi; *Socrates no Benshōhō* (Dialectic of Socrates) Tokyo 1948. M. Abe; *Socrates Kenkyū* (Studies in Socrates) Tokyo 1940, etc.

origin of *philosophia*; *theoria* and Socrates; the philosophy of Socrates and his death; what destroys philosophy; the politics and thought of Greece; the ethical thought of *kosmopolites*—written with the focus on Socrates, from 1931 to 1941, a period of agitation and confusion ending with the outbreak of the fatal Pacific War. The author himself says, “these articles are not so much professional studies as reviews with a more or less cultural background intended for the general public.” Therefore, we cannot look for any new interpretation or theory of Socrates here. What the author consistently asserts in these articles is, “In acting or in making, without *theoria* to discern and perceive the truth as is involved in the object itself, nothing will come of it.” In other words, “without the guidance of philosophical *theoria* of high exactness, *praxis* becomes powerless and ends in no policy, while, on the other hand, real statesmen should improve their government by practising and promoting *theoria*.” That is to say, this book is a kind of *Προσπειρητός Λόγος* which advocates and exhorts the politicizing of philosophy and the philosophizing of politics, and in this sense the author’s attitude is most appropriate as regards Socrates.

On Plato

Plato has been honoured, recited, translated and discussed as the eternal teacher of mankind, not only by philosophers but even by poets and men of letters in Europe for more than 2,000 years. Likewise in Japan, since the introduction of Greek philosophy, research has centered on this philosophical master of Athens. This is sufficiently proved by the facts that all of Plato’s works have already been translated, and are yet continuing to be translated, and that treatises and writings on Plato are numerous in comparison to other philosophers of either ancient or modern times. Indeed, Plato and Kant have been the two idols that reigned the philosophical world of Japan during the past fifty years. Therefore, it is difficult to report comprehensively and in detail on all the studies of Plato in this country.²⁷ Setting aside popular and introductive works, I only wish to touch upon a few representative works worthy to be recommended as professional studies.

It can be said that J. Stenzel’s epoch-making book, *Studien zur Entwicklung der Platonischen Dialektik von Sokrates zu Aristoteles*, Berlin 1917 shows in a sense the chief direction of study on Plato during the last half century, as it was appropriately evaluated and located by W. Jaeger.²⁸ That is to say, the result in deciding the order and chronology of the dialogues of Plato which the philological study of Plato discovered by mobiliz-

²⁷ E. g. N. Nagasawa; *Platon*. Tokyo 1936. A. Tanaka; *Platon to Aristoteles* (Plato and Aristotle) Tokyo 1944. T. Abe; *Platon*. Tokyo 1939. *Platon Kokkohen* (The Republic of Plato) Tokyo 1936, and many articles, essays and dissertations on Plato.

²⁸ Cf. W. Jaeger; *Platos Stellung im Aufbau der griechischen Bildung*, in *Humanistische Reden und Vorträge*. Berlin und Leipzig 1937. Furthermore, see W. Jaeger’s memory of J. Stenzel, in *Gnomon* Bd. XII 1936. Heft 2.

ing many superior minds in the latter half of the 19th century and the work pursuing the system of Plato's philosophy, which has been proposed by philosophers—e.g. H. Cohen and P. Natorp—are successfully unified to a high degree in Stenzel. In other words, one may say that in Stenzel, by harmonizing the philological and philosophical studies on Plato, the tracing of his development in the truest sense became possible for the first time. Accordingly, persons who plan a study of the Platonic theory of Idea must first take account of Stenzel's interpretation. In case they can succeed in overcoming it, then it may be possible for them to frame a new theory on Plato.

This is exactly what Kumatarō Kawada, professor of Tokyo University intended in *Platon Benshōhō no Kenkyū* (Study in the Dialectic of Plato), Tokyo 1940. According to him, the complete dialogues of Plato are divided into four groups, centering around the *Apologia*, the *Respublica*, the *Sophista* and the *Philebus*.²⁹ Furthermore, the methods characterizing each group throughout are respectively elenctic, synoptic, analytic (or dividing), and causal (or mixing). The two former groups form the early theory of Plato, the latter two groups the later theory. Though Stenzel has made clear the development and philosophical meaning of the dialectic of the later Plato by penetrating observations on the *δόξα-ἐπιστήμη*-problem in the *Theaetetus* and the *διαίρεσις*-method in the *Sophista* and the *Politicus*, his treatment of the *Philebus* is quite insufficient. This dialogue can not be understood merely by the logical interpretation of the *διαίρεσις*-method as in the *Sophista*. For, in this case the fundamental dialectic of causes rather than the dialectic of Ideas dominates. Of course, in the early period also, the theory of Idea sometimes implies the theory of cause, but the latest ontological standpoint of Plato maintained by the *Philebus*-group is explicitly distinguished from the *διαίρεσις*-theory emphasized by Stenzel and should be the *αἰτία*-theory which observes the various causes of the Idea and genesis of existence. Thus Professor Kawada scrutinizes the causal theory, from the angle of "dynamism of *παντελῶς ὄν*," using the ontology of the *Philebus* as a clue. The strong influence of L. Robin can be seen in his interpretation.³⁰ I am not always in agreement with his conclusions. Especially, I cannot help expressing dissatisfaction in regard to the fact that sufficient attention is not paid to the *Timaeus* and the *Leges* which, I believe, have the most important significance in Plato's causal theory. However, the value of this work should be fully recognized in promoting the study of Plato in the right direction.

²⁹ 1, (Apologia-group) *Io*, *Hipp. minor*, *Prot.*, *Apol.*, *Crito*, *Euthyphro*, *Lach.*, *Charm.*, *Lysis*. *Resp.* I. 2, (Respublica-group) *Gorg.*, *Meno*, *Menex.*, *Euthyd.*, *Cratyl.*, *Symp.*, *Phaedo*, *Resp.* II-X. 3, (Sophista-group) *Phaedr.*, *Parm.*, *Theaet.*, *Soph.*, *Polit.* (the former half). 4, (Philebus-group) *Polit.* (the latter half), *Tim.*, *Crit.*, *Phileb.*, *Epist.* 7. *Leg.*

³⁰ I.e. L. Robin; *Platon*. Paris 1935. *La Théorie Platonicienne des Idées et des Nombres d'après Aristote*. Paris 1908.

A work which recently contributed with great success to this subject is *Girisha no Tetsugaku* (Greek Philosophy) 2 Vols, 1944-1948, by Tokuryū Yamanouchi, emeritus professor of Kyoto University, a respected teacher to whom I am greatly indebted. He is better known as a systematic philosopher rather than as a historian of philosophy, being the author of various outstanding works on phenomenology, ontology, and philosophy of existence. In his book which deals with ancient philosophy, he endeavours to trace systematic unity rather than solve the various philological problems involved.³¹ The whole second volume is devoted to Plato, in which, as may be expected, the various subjects such as the life of the philosopher, his works, the theory of Idea, dialectic, the theory of numbers, the soul and God, politics and statesmen and aesthetics are treated after the manner of general history of philosophy. What distinguishes this book from other commonplace books on Plato is the keen interpretation of the theory of Idea. Following the commonly recognized opinion, he divides the development of Platonic philosophy into two periods, viz. from the Socratic dialogues to the *Respublica*, and from the *Phaedrus* to the *Leges*. In the early period, the static and synoptic theory of Idea, that is contemplation of the hypothesized Idea meaning heavenly, eternal existence, while in the later period the dynamic and diairetic theory of Idea, that is generation leading of earthly, realistic existence (*γένεσις εἰς οὐσίαν*) are the central subject. *γένεσις* here used does not mean physical *generatio* but rather artistic *formatio*. And so far as *formatio* is concerned with things human, being distinguished from Christian *creatio*, forms the essence of the later theory of the Platonic Idea. Professor Yamanouchi seeks the basis of this characteristically defined *formatio* chiefly in the idea of *δημιουργός* of the *Timaeus*. Accordingly, emphasis is placed more on the *Timaeus* than on the *Philebus*, giving the Idea of Plato a wider and deeper foundation than the causal theory of Professor Kawada. Regrettably, I must refrain in this brief report, from an attempt to convey in detail the logical provisions of Yamanouchi's interpretation.

The author of *Sophist*, M. Tanaka, wrote two books, *Logos to Idea* (Logos and Idea) in 1947, and *Zen to Hitsuzen to no aidani* (Between the Good and the Necessary) in 1952. These are both collections of treatises, the former including the different themes of reality (*παρὸν πάθος*), future, past, time, logos, misologos, nomina and Idea, the latter with the various headings of the minimum state (*ἡ ἀναγκαιοτάτη πόλις*), between the good and the necessary, art, and the meaning of the good. Therefore, these do not directly deal with Plato as subject but rather with eternal philosophical problems. But Professor Tanaka endeavours to interpret correctly these vari-

³¹ The contents of the first volume are philosophical thoughts of Greece from the Milesian school to the lesser Socrates with "disposition of logos" as their introduction. The whole construction and interpretation of this volume remind us of K. Joël's *Geschichte der antiken Philosophie*, Bd. 1. Tübingen 1921.

ous problems from the standpoint of Platonism. And, with his philological erudition and philosophical keenness, highly convincing conclusions are given. For this reason, these books are symbolic of the period of criticism and philological-philosophical research which is the present stage in the study of Greek philosophy in Japan.

On Aristotle

Just as J. Stenzel made a decisive contribution to the study of Plato in this century, Professor W. Jaeger cultivated the indestructible royal way in the study of Aristotle by establishing "the fundamentals of the history of Aristotle's development." His brilliant work on Aristotle is already well known throughout the world, and it is unnecessary to repeat it here, even though many improvements and alterations may be made by further study.³² Therefore, anyone who wishes to express something new on Aristotelian philosophy must start out with the image of Aristotle superbly carved by Jaeger, as long as one sufficiently reflects upon the history and tradition of Aristotle's interpretation, believing in the constant progress of learning. Professor Jaeger's *Aristotle* is certainly the *terminus ad quem* and at the same time the *terminus a quo* in Aristotelian study of this century.

With this conviction, I wrote two books, *Aristoteles Kenkyū* (Studies in Aristotle) 1940 and *Aristoteles no Rinrigaku* (Ethics of Aristotle) 1950. The former is composed of four headings; on the theme and composition of the *Metaphysics*, the development of ἀλήθεια-concept in Aristotle, on the two περὶ φύξης of Aristotle, and the development of Aristotelian epistemology. Therefore, the title that runs through this book may be replaced by "from the *Metaphysics* of Aristotle to his epistemology." What I intended in this book was to build up the developmental history of the "epistemology of Aristotle" following the Jaeger method, as F. Solmsen and R. Walzer has accomplished in both the logical and ethical fields.³³ It is an undisputable fact that such German scholars as F.F. Kampe and J. Geyser had made large contributions to this difficult problem through their famous writings under the same title.³⁴ At the same time, however, we can not fail to point out their non-historical character coming from their preoccupation with the traditional "system of Aristotle," disregarding his development. In consideration of their rather out-of-date interpretations, my book aims at making it possible to form a theory on the cognition of the Stagiritic with historically greater truth. This not only reconstructs

³² Cf. P. Wilpert; *Die Lage der Aristotelesforschung*, in *Zeitschrift für Philosophische Forschung*, Bd. 1, 1946.

³³ F. Solmsen; *Die Entwicklung der Aristotelischen Logik und Rhetorik*, in *Neue Philologische Untersuchungen*, hrsg. v. W. Jaeger, Heft 4, Berlin 1929. R. Walzer; *Magna Moralia und Aristotelische Ethik*, in *Neue Philol. Unters.* Heft 7, Berlin 1929.

³⁴ Cf. F.F. Kampe; *Die Erkenntnistheorie des Aristoteles*. Leipzig 1870. J. Geyser; *Die Erkenntnistheorie des Aristoteles*. Münster 1917.

epistemology but also anticipates a new concrete system of Aristotle.

The latter, likewise guided by the studies of Jaeger and Walzer, using the development of the *εργασία*-concept which played an important role in ancient philosophy as a clue, establishes the inter-relation of the three ethical works attributed to Aristotle. It attempted to clarify the meaning and position within practical syllogism or moral judgment by close analysis of this idea which is especially manipulated in the *Nicomachean Ethics* and the *résumé* of this book, entitled *Aristotle's Theory of Practical Wisdom* was contributed to this Annals in 1951.³⁵ If fortunately these books of mine should add something to the study of Greek Philosophy in Japan and if they can claim their *raison d'être* in the present stage of our philosophical world, it will be due to a very evident and natural attitude, sometimes neglected in this country that philosophical theories and interpretations of Greek thought must be built upon a strict philological and correct historical foundation.

Keiji Nishitani, who is professor at Kyoto University and successor to S. Iatano, in his book *Aristoteles Ronkō* (Treatise on Aristotle), Tokyo 1948, endeavours to gain a systematically unified understanding of Aristotelian philosophy from *logical* and *physical* research in regard to the three problems of sense-reception (*αἴσθησις*), imagination (*φαντασία*) and reason (*λογισ*). He is one of the deep-minded and leading philosophers in contemporary Japan, and in his work gives an interpretation full of suggestion about the various difficult passages of the Stagirite. However, these all presuppose the possibility of a traditional "system of Aristotle," and he seems to be attempting to understand Aristotle philosophically rather than historically, in other words, more from a standpoint close to St. Thomas and Hegel than Aristotle himself. This seems to be the characteristic of his book on Aristotle.³⁶

No works worth while mentioning have been prepared in relation to Hellenistic philosophy, with but a few exceptions.³⁷ This reveals the shallowness and narrowness of the basis of study of Greek philosophy in Japan which is a task assigned to the future.

³⁵ See my article, in Annals of the Hitotsubashi Academy. Vol. II, No. 1, Oct. 1951.

³⁶ In addition to these three, the following works on Aristotle may be cited here: *Selected Works of Aristotle*, translated by T. Ide, Tokyo 1947. I. Aoki; *Aristoteles*, Tokyo 1927. K. Miki; *The Metaphysics of Aristotle*, Tokyo 1935 and *Aristotle*, Tokyo 1938. (The Complete Works of Kiyoshi Miki. Vol. IX, Tokyo 1947).

³⁷ For instance, Cicero, *Laelius de amicitia*, translated by N. Nagasawa and *Cato maior*, tr. by T. Saito. Tokyo 1943. Epictetus, *Dissertationes*, tr. by K. Haranō. Nara 1949. Plutarchus, *Parallelae Vitae*, tr. by Y. Kōno. Tokyo 1952 ff. (in progress). *Moralia*, selected and tr. by I. Aoki, Tokyo 1948. Plotinus, *Enneades*, V, 1 (On the three Hypostases), VI, 9 (On the Good or the One), tr. by M. Tanaka. Osaka 1948. Proclus, *Institutio theologica*, tr. by T. Igarashi. Tokyo 1944. Boethius, *De consolazione philosophiae*, tr. by T. Hatakenaka. Tokyo 1938. J. Shikano; *Stoa no Tetsujin-tachi* (the Stoic Philosophers). Tokyo. do.; *Plotinus* Tokyo 1939. T. Ide; *Plotinus Enneades*. Tokyo 1936.

In order to arouse interest for ancient philosophy, I had planned the publishing of *Tetsugaku-shi Kenkyū* (Study of History of Philosophy) in 1949, in cooperation with Professor Yamanouchi, and really published a first volume, but was forced to postpone the work because of the publisher's convenience. However, the *Classical Society of Japan* has been organized by almost all classical philologists and scholars of ancient philosophy in Japan, and its organ, *Seiyō Kotengaku Kenkyū* (Journal of Classical Studies) was published early this year. This is an epoch-making event, because we can safely say that a new lodestar has appeared in the development of the study of Greek philosophy in Japan, promising steady and rapid progress in the future.

— Written in November, 1953 —

HUMAN RELATIONS IN THE JAPANESE SOCIETY¹

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I. *Problem of Methodology*—A critique of American psychological studies of the Japanese, especially of those by Ruth Benedict—

1) On the methodology in general

Ruth Benedict was as important a figure as Margaret Mead in the American social anthropology. When we examine the content of their studies, however, they are in marked contrast to each other on various points. Especially on the method of social anthropology they are definitely opposed to each other.

In the social anthropology of Mead, the technique of psychology is applied to members of a primitive society. Out of a collection of such individual case studies, she tries to abstract a psychological characteristic or character common to members of the society.

On the other hand, Benedict mainly tries to reach the cultural characteristic or the pattern of culture of a primitive society through the various aspects of cultural life in the society.

Consequently while Mead puts more emphasis on the collection of data by means such as the interview of individuals, the observation of children's behavior and photographic recording, Benedict tries to collect materials in group behavior or institutions, to understand the culture as a whole.

In other words, while Mead is interested in reaching the social psychology through the individual psychology, Benedict interprets the individual behavior from the social psychology of the people as a whole.

It is clearly seen in "the Chrysanthemum and the Sword" as well that Benedict uses mainly a descending method against the ascending method, so to speak, of Mead. There Benedict traces the cultural history of Japan, especially the development of moral thought, to abstract a pattern of culture, or "some degree of consistency" in "a system of value by which to live, and to make a design of living."²

¹ Part I of this paper is a slightly modified English version of the original article, *Shakai Shinrigaku no Tachiba kara* (From the standpoint of a social psychologist), *Minzokugaku Kenkyu* (The Japanese Journal of Ethnology), Special Issue on the Chrysanthemum and the Sword, Vol. 14, No. 4, 1949, Pp. 271-274. Part II is an excerpt from a final chapter of author's book, *Nihonjin no Shinri* (The Psychology of the Japanese People), 1953, Iwanami, Tokyo.

² Benedict, Ruth; "The Chrysanthemum and the Sword" 1946, P. 12.

Benedict then tries to find out the Japanese ways of life and "Japanese assumptions about the conduct of life"³ by analysing the content of Japanese literature and movies.

In either cases, books on Japan which were available in wartime Washington could not be complete, to our regret, and her materials were not reliable for the proper understanding of Japan after 1930 in particular. Moreover, Benedict was not thorough enough in the analysis of the more basic political and economic structure in studying Japan.

This will find a proof in the following statement of Benedict showing her over-confidence in her own field.

"Other social scientists who were studying Japan were using libraries, analysing past events or statistics, following developments in the written or spoken word of Japanese propaganda."⁴

This statement reveals that Benedict did not pay enough attention to the recent studies on of the Japanese political and economic structure written by many outstanding social scientists both in America and Japan. Of course, she was helped a great deal by the historical studies of Herbert Norman, Hugh Borton, and other American specialists on Japan. However, her understanding of Japanese history after the Meiji Restoration, especially that of the contemporary history, seems very doubtful.

This weakness resulted in another serious limitation to her method of study. That is the interview technique she used.

Benedict understands that the ways of life or the culture of Japan have been almost stagnant after the middle of Meiji era. This is due to the unhistorical view that social anthropologists often commit. It is quite natural that she, understanding the Japanese culture fixed like this, interviewed the resident Japanese in Washington as samples for the case study of the Japanese.

Benedict, as a social anthropologist, could not omit the case study using interview technique. Being disposed to the above-mentioned descending method against Mead, however, Benedict believed that she could study the Japanese culture by "asking the Japanese reared in Japan about the concrete facts of their own experience."⁵

At this point we must raise the question of whether or not those resident Japanese selected for this interview were appropriate as samples both in number and qualification.

As to their qualification, she seems to have selected considerably old generation as samples since she was mostly concerned with the stagnant character of the Japanese culture. Most of the resident Japanese are those who have "pure-cultured" the Japanese culture in Meiji or at the beginn-

³ *Ibid.*, p. 13.

⁴ *Ibid.*, p. 6.

⁵ *Ibid.*, p. 6.

ing of Taisho era. They were born in Japan in Meiji, and came to the U.S. with the contemporary culture of Japan. Since then they have been confined in a group of the Japanese in the U.S. without influenced much by either the development of culture in Japan proper or that of the U.S.

As a result of interviewing samples which included such a special group of the Japanese, it became natually very difficult to understand properly the contemporary Japanese culture.

Japanese movies, that Benedict saw with the Japanese and was helped in their interpretation, were not necessarily those carefully selected to represent the contemporary Japanese movies.

Furthermore, the limited amount of materials she could have for analyzing the Japanese literature and plays, of course, could not be anything close to be of any help to throw a proper light on the complex social psychology of the contemporary Japanese.

Thus we come to know that her study of the Japanese culture, despite her most conscientious efforts in wartime Washington, did have inevitable weakness due to the difficulties of gathering appropriate materials.

Another point which is open to arguments is her opinion on the interview technique. She claims that in an interview to find out the Japanese way of life "one quickly reaches the point where the testimony of great numbers of additional informants provides no further validation," "who bows to whom and when, for instance, needs no statistical study of all Japan."⁶

Holding that "socialists and psychologists are preoccupied with the 'scatter' of opinion and behavior," she criticizes them for not trying to understand the basic way of life or the culture.⁷

She is right as long as she criticizes the mechanical quantification and overestimation of statistics which are the shortcomings often found American social scientists. However, it is doubtful whether the adequate number of samples in an interview can be determined so easily as Benedict thinks. It should be considered relative to the quality or representativeness of sample as well. In this connection, it is suggestive that her sample consisted, as indicated above, of mostly those with the pure Japanese culture.

Thus "the Chrysanthemum and the Sword" can not be called a proper and dynamic understanding of the contemporary Japanese culture, being handicapped by the inadequate selection of basic materials and the lack of thoroughness in its historical perspective. Despite these handicaps, however, Benedict undoubtedly found out various aspects of the Japanese culture through channels which we Japanese could not think of.

2) On the concept of "the Japanese"

Using a method as examined above, Benedict intends to find out the

⁶ *Ibid.*, p. 16.

⁷ *Ibid.*, p. 17.

pattern of culture of Japan. What is called the pattern of culture in this case is the "design for living"⁸ as quoted above, or "certain ways of meeting situations, certain ways of sizing them up"⁹ in the social life, or "Japanese assumptions about the conduct of life."¹⁰

Those who feel uneasy about such a vague definition of the pattern of culture will find the following statement, as they proceed. "This book, then, is about habits that are expected and then taken for granted in Japan"¹¹ and "the ideal authority for any statement in this book would be the proverbial man in the street."¹²

As is clear from the above, the pattern of culture in Benedict's sense is the design for life among the proverbial man in the street or "anybody." Assuming such anybody in a society first, a pattern of culture is defined as a system of their common agreements on the social behavior.

Benedict naturally meant an average man by 'anybody.' Although it may be a concept fairly appropriate to a member of a comparatively simple and uniform society which social anthropologist are usually accustomed to deal with, it can be a complete nonsense when applied to a complicated modern society?

Then what kind of people shall we mean as 'anybody' or an average man in Japan, a modern society?

Firstly, from the viewpoint of social classes, he will be the one that stands at the middle of the social scale. Then he will be a petty bourgeois or one from the so-called middle classes.

Secondly, statistically or quantitatively speaking, a man who belongs to the largest social class will be called an average man. Undoubtedly there is a big lower class of labourers and farmers in Japan.

Another concept will be an abstract one, an aggregate Japanese. It is a personification of various characteristics extracted as a pattern of culture of Japan. Although it can never be a real existence, any Japanese is considered to have something common with this aggregate Japanese.

"The Japanese" which is often used by Benedict seems to be the first one of the above three concepts, since she refers to "anybody" or a "proverbial man."

However, she also defines "the Japanese" statistically, using a vague expression as "all men." For instance, in her discussion of the Japanese prisoners of war, she gives a verdict that they are all for the Emperor except very few, and employs such expressions as "He (the Emperor) was all things to all men,"¹³ or "all this unanimity in reckoning the Emperor

⁸ *Ibid.*, p. 12.

⁹ *Loc. cit.*

¹⁰ *Ibid.*, p. 13.

¹¹ *Ibid.*, p. 16.

¹² *Loc. cit.*

¹³ *Ibid.*, p. 31.

above criticism"¹⁴ or "an all but unanimous Japanese veneration."¹⁵ In these cases, the average man is a statistical concept representing the majority of the Japanese. They are of course considered as a sample taken from a cross-section of social classes in this case, and in this connection she also makes a statement as "they represented a cross-section of opinion in the Japanese Army."¹⁶

In other words, her statistical average man does not represent a social class that occupies the largest portion of the national population, but it is merely a type crosscutting those strata of the Japanese people who have in common a certain social attitude such as the Emperor worship. There will be no need to point out the danger of using such an expression as "all the Japanese."

It is also clear that the concept of "the Japanese" proposed by Benedict often corresponds to the third category, that is, a typical or an aggregate Japanese. When we read "The Chrysanthemum and the Sword" we should keep it in mind that this obscure "Japanese" in the book is exactly what an abstract type she created.

This very point, however, is the basic shortcoming of "The Chrysanthemum and the Sword." In other words, its methodology is too rigid and unhistorical to understand the social psychology of the Japanese in contemporary setting.

3) On the "dual personality" of the Japanese

Despite the shortcoming as indicated above, "The Chrysanthemum and the Sword" has succeeded in abstracting various tendencies of social behavior that most of the Japanese have in common. The very fact that it is a work by an American has helped to throw a light on many aspects which we, the Japanese, have overlooked in our daily life, even though some exaggeration and distortion were inevitable. Now we shall examine more closely the dual personality of the Japanese which Benedict considers as one of the most important characteristics of the Japanese psychology.

It is needless to say, that Benedict as an American social scientist has a more or less psychologistic tendency. Even though not so strong as with Mead, mentioned at the beginning of this article, it is as well noticeable in Benedict's discussion of the question of culture and personality.

Benedict holds that formation of the dual personality of the Japanese can be explained from their childhood experience. She gives "their (Japanese) experience of privilege and psychological ease in babyhood"¹⁷ as what "produce a duality in their (the Japanese) outlook on life"¹⁸ and "contra-

¹⁴ *Ibid.*, p. 32.

¹⁵ *Ibid.*, p. 33.

¹⁶ *Ibid.*, p. 31.

¹⁷ *Ibid.*, p. 286.

¹⁸ *Loc. cit.*

dictions in Japanese character."¹⁹

Since "they (the Japanese) retain.....the memory of an easier life when they 'did not know shame',"²⁰ in their adulthood "he (they) goes back to them (the experiences of that earlier period) in his (their) permissiveness about human feelings."²¹

Is it, however, peculiar to the Japanese that the adult often become 'innocent', going back to their childhood?

According to Benedict, a man in Japan has "his exuberances, as well as his areas where great restraint is required,"²² and a good example of that is drinking in male company with geisha attendants. She also understands that a man in Japan re-experiences the easiness of his childhood in "such 'free areas' as drinking"²³ or "in his permissiveness about 'human feelings'."

It is needless to say that a 'free area' of drinking does not belong only to the Japanese. It is the same in American that drinking disinhibits what is inhibited in the daily life and releases the tension, and often turns into a wild party. We do not think that it should be called a duality in the outlook on life or dual personality characteristic of the Japanese.

Benedict also says that "the contradictions in Japanese male behavior which are so conspicuous to the Westerners are made possible by the discontinuity of their upbringing."²⁴ What she calls discontinuity here is an idea based on her proposition about social conditioning elaborated in her previous paper.²⁵

In the process of learning various rules of social behavior from the childhood to the adulthood through the social agreements should be definitely different between child or babyhood and adulthood, the social or cultural conditioning is said discontinuous.

On the other hand, it is continuous where the social norms for in childhood are the same as in adulthood or the transition of one to the other is very gradual and continuous.

Then what she calls the discontinuity in the Japanese discipline will be that between the laissez-faire cultural conditioning in the Japanese babyhood and the strict social restrictions in their adulthood.

As an example she cites that in Japan very free sexual games and masturbation of pre-school children are not condemned or children are free in hurling criticisms at each other and boasting while the adults must keep away from all of these. She understands that "it is the great gulf fixed

¹⁹ *Loc. cit.*

²⁰ *Loc. cit.*

²¹ *Ibid.*, p. 287.

²² *Ibid.*, p. 285.

²³ *Ibid.*, p. 286.

²⁴ *Ibid.*, p. 290.

²⁵ Benedict, Ruth; Continuities and discontinuities in cultural conditioning, *Psychiatry*, Vol. I., 1938, pp. 161-167.

between the little child and the adult."²⁶

However, she also says in the same place that "the children know the facts of life both because of grown-ups' conversations and of the close quarters in which a Japanese family lives."²⁷

As is clearly seen from this, even though the cultural conditioning in sexual behavior in this case may appear discontinuous, in the reality, under the environments where the grown-up have a free sexual life, the children receive free sexual discipline continuously. Then, the discontinuity in the Japanese discipline she emphasizes is not necessarily universal, but, in the case of sexual behavior, it is rather continuous.

Thus Benedict's approach to the question of Japanese culture consists of setting up an abstract type called "the Japanese" and characterizing it with a duality formed by a discontinuous social conditioning. It clearly betrays an influence of a rather mechanistic social psychology on the American social anthropology.

The social psychology, on the contrary, should elaborate the study of the basic economic and political structures of a society. We should try to analyze the society as a complex of many mobile classes and to find out the common denominator among people in each of these classes on the social behavior.

The concept of "Japanese" in general, a person as an aggregate of personalities and tendencies of behavior of various people in various classes, or a *psychological giant* is not a proper method to understand the complicated behavior of the Japanese living in the Japanese society of today.

In this sense, "The Chrysanthemum and the Sword" provides us a lesson that the social anthropology is not capable of analyze culture of a modern society without the help of neighbouring branches of the social science.

II. *Human Relations in Contemporary Japan*

As seen in "The Chrysanthemum and the Sword," the study of a given culture as a more or less uniform entity is apt to distort facts unwittingly, since it is based on some sort of generalization. Although it may keep logical consistency, a forcible interpretation of facts seems almost inevitable.

In dealing with the psychology of the Japanese people, we shall try to point out the characteristic aspects of human relations in, the Japanese society in order to reach a clue to the process by which a psychology common to most of the Japanese people came into existence.

Psychological characteristic of the Japanese comes out from the human relations within the social structure of Japan which has been moulded in her age-long history.

²⁶ *op. cit.*, p. 270.

²⁷ *Loc. cit.*

Since the present Japanese society, which is basically capitalistic, still contains certain semi-feudalistic remnants, her human relations are also coloured with both the modern and pre-modern phases. The most characteristic point of the Japanese human relations, therefore, lies in this delicate balance between the new and the old. This balance is so subtle that it may hardly be understood by foreigners.

The essential element which is not modernized in the Japanese human relations is "*Giri*," a pre-modern social agreement, by which her human relations are tied up. *Gimu*, the duties backed by the modern concept of rights in the capitalistic society, complicates our human relations by getting subtly entangled with the feudalistic *Giri*.

Giri has several meanings in Japanese, and its broadest idea can be defined as a social agreement or understanding to square one's actions with a thorough understanding of "what to do" in one's society. This agreement, unlike *Gimu*, is not backed by any rights.

Giri demands a clear understanding of one's relationship with others in his social life, and it is an agreement on the attitudes and actions which he should take towards everyone of his fellowmen. As a pre-modern type of social control, *Giri* demands everyone to behave "as he should" without argument.

For example, *Gi* was said to have such a meaning as "to live and die when he should, and to decide coherently."²⁸ In *Shingaku* (the popular moral teaching in the Tokugawa era), *Gi* means "not to be unreasonable"; a subordinate, for example, serving at his best and a wife taking good care of her husband, are "acceptable," and "this acceptability is the human way of life."²⁹

In other words, *Giri* implies that one be satisfied as he is in the present society, or it is a forced agreement to rationalize the "spirit of self-sacrifice for the public cause" which has long been rooted in the mind of the Japanese.

In general, *Giri* originates in the demand of the high for the loyalty and service of the low. In return, the high are also expected to have whatever affection and gratitude to the low.

For example, in the household instruction of Ise Teijo,³⁰ it is stated that "it should be *Giri* of the master to be grateful to subordinates for their services without thinking much of the allowances and fees to them." In this way both the high and the low are supposed to have mutual *Giri*.

Budo Shoshin Shu states that "there are two groups of the feudal retainers," and "those below foot-soldiers, i.e., the lowest among them" are "not altogether unpardonable even if they should desert or be coward at the battlefield" since they are supplied with only "small allowances." On the

²⁸ Muro, Naokiyo; *Gojo Meigi* (Meaning of Five Virtues), 1718.

²⁹ Shibata, Kyuo; *Kyuo Dowo* (Moral Teachings of Kyuo), 1835.

³⁰ *Ise Teijo Kakun* (Household Instruction of Ise Teijo), 1763.

other hand, those "under the favor of several generations" are expected to "be willing to sacrifice their lives in the cause of *On* and the intimate favor they have been given by their master."

As is clear from the above quotation, both *Giri* and loyalty are a matter of mutuality; the more "*On*" they get from their lords, the heavier *Giri* and loyalty stay in their minds. In other words, the loyalty or service among the *Samurai* in the Tokugawa era implied much of the meaning of exchange or contract.

Since the beginning of the Meiji era, however, only the sacrificial and unselfish service for the Emperor was stressed, and the absolute obedience to the authority as well as the self-negation were forced upon the whole people, with loyalty as *Giri* becoming a one-way proposition.

Let us see its example in a book written during the last World War. It goes so far as to say:

"In the first place, duty should be taken with a sincere heart to serve the Emperor," or, "There is no private life.....besides a sacrificial one of service."³¹

In such an Emperor-centered national constitution, "however hard one may serve, there should be no end to it: here, service and its reward are not considered interdependent on each other."³²

To our surprise, even after the war, some of the ex-officers declare publicly this unselfish service for the Emperor to be the characteristics of the Japanese. One of the writers of *Kamikaze Tokubetsu Kōgekitai* (The *Kamikaze* Squad) (1951), who was a commanding officer of the Suicide Squad answers to the American investigating commission as follows, ".....it is the inherent spirit of the Japanese.....to sacrifice their whole body and soul for the Emperor....."

Next comes *Giri* among the family members. Here *Giri* appears under the form of children's filial piety for their parents' affection. In this case, the affection between parents and children is tied with *Giri*, only to make it impossible to separate *Giri* from "*Ninjo*" (which roughly corresponds to the humane feelings or human affection).

However, when it is a matter between in-laws, especially between housewife and her mother-in-law in rural areas, *Giri*, being stressed, becomes like the loyalty among *Samurai*: the mother-in-law seems to think that "it is beyond question for the daughter-in-law to do suitable service since such a family fortune is to be handed over to her as it is."³³

What is characteristic in the Japanese family relations in the most rural

³¹ *Shinmin no Michi Kaisetsu Taisei* (Complete Examination of 'The Way for Loyal Subject'), 1942.

³² Ohkura, Kunihiro; *Musubi no Sangyo* (Industry of *Musubi*), 1942.

³³ Ohmura, Ryo; *Nohson ni okeru Sekentei* ('*Sekentei*' in the Farming Areas), *Toyo Bunka* (Eastern Culture) No. 12, 1953.

communities even at present is that the father's status as a head of the family is much higher than the mother's, and the same can be said as to the eldest son's in the family as compared with his brothers' and sisters.' Such family relations are supposed to be the basis of the idea of 'superiority of men over women' which is still persistent among the Japanese. It should not be strange, then, that such expressions as "a talk between men" or "to raise man (in the public estimation)" are heard even in the diet debate.

Thus, in Japan, as there is a sort of union between a father and his eldest son, so a team opposed to men's can easily be formed between a mother and her daughter. For this strong emotional tie among female members of the family, there are many daughters who have stronger feeling of *Giri* towards their mothers. A street-walker confessed, "From now on, I will work hard and honestly, and wish to have my dead mother see my being a good girl again."³⁴

The significance of the family relations in the Japanese society can be found in the fact that all the Japanese human relations are more or less permeated with the pattern of family relations. The Japanese family, unlike that of the Western society which is "husband-and-wife centered," places the father "at the top of the whole family members with qualified power to lead the others exactly as in the Army where the commanding officer will be comparable to the father."³⁵ Thus the family system in Japan is characterized by the father-centeredness and *Giri* among family members, and this pattern is followed by other social groups.

Because most of the Japanese people are to play roles of pseudo-parents or pseudo-children in any social groups other than family, both family-like fidget and confederacy are rooted deep in the social psychology of the Japanese.

"*Oya-gokoro*" (Parental feeling) -ism or "*On-jo*" (Warm feeling) -ism, characteristic to the Japanese human relations, are some of its examples. This is "a sort of self-consciousness that the superiors should always be in the position to love and guide their inferiors."³⁶

This *Oya-gokoro*-ism takes a clearer shape, when it comes to a military life with emphasis on the family-sentiment. A former officer explains this as follows, "The warrant-officer is like a housewife who takes good care of soldiers as a mother, while the company-commander may be likened to a father who gets his orders observed strictly, but has affections of kinship towards his soldiers."³⁷

The following episode reveals what the Japanese military were aiming at: "November 30, Meiji 37th year, I, as a head of a company, participated

³⁴ Takenaka, Katsuo and Suminoya, Etsuji; *Gaisho* (Street-walkers), 1949.

³⁵ "Industry of *Musubi*."

³⁶ *Ibid.*

³⁷ *Nihon no Guntai* (The Japanese Army), 1950.

in the 203 height's attack.....Since it was a midnight encounter not a bit of the commander's figure could be seen. This may have made the soldiers feel somewhat uneasy, and their shouts were heard once in awhile, calling, 'Is the commander here?' I answered, 'Here I am!' to them. Then the shouts of joy broke forth."³⁸

Among the human relations as seen above, there is a Japanese psychology which may be characterized by their reliance on the family circle, this tendency preventing them from developing their ego.

Oya-gokoro-ism among the Japanese leaders brings forth an eccentric tendency to seek for the sacrifice of their inferiors who are counted as their children. For instance, a commander of the Suicide Squad said: "With such a deep attachment towards my inferiors as any parents would have to their children, I wanted to find a good chance for them at any risk to do some respectable service for the Emperor."³⁹

Giri takes other forms than the definitely vertical, i. e., from up to down, relations which we have so far discussed. For example, it is also *Giri* that, between merchant and customer, the latter is treated as a master.

"A Survey of the Public Opinion on the Social Education" published by the National Research Institute of Public Opinion in March, 1953 year, reveals that *Giri* as a social rule is still supported by the elder generation at least.

Giri becomes so-called "*Na* (name)" or "*Sekentei* (reputation)" when it is applied to the "*Seken* (society or people)," instead of particular superiors or individuals. This "*Sekentei*" does not mean any fixed social value system, nor the public opinion as a social consensus. It is rather the value image of one's surroundings which vary from one person to another.

To comply with *Giri* to *Seken* in the narrowest sense, "people will not behave in a manner which is not accepted by their neighbours." Here, what is "ought to be" to one's neighbours is understood as *Giri*. In *Giri* to *Seken*, it is the agreement not to do what are against *Seken*.

"Everybody is obliged to his country, ancestors and surroundings for his life at present."⁴⁰ This vague expression, "surroundings," is after all *Seken*. Thus, people can serve it, by keeping *Giri* to the society.

In the above mentioned survey on the social education 30% of the respondents answered that it meant not to know '*On*,' and 10% 'egoism' when asked, "what is meant by 'not to know *Giri*'?" The survey, therefore, shows that many people still consider requital of a favor or service are what *Giri* demands.

While *Giri* is a social rule for old feudalistic human relations, the social attitude which denies *Giri* has been considered as acquisitiveness.

³⁸ Uchiyama, Yujiro, *Senjo Shinrigaku* (Psychology of Battlefield).

³⁹ Inokuchi, Rikihei and Nakajima, Tadashi; *Kamikaze Tokubetsu Kogekitai* (Kamikaze Suicide Squad), 1951, p. 50.

⁴⁰ "Industry of *Musubi*," op. cit, p.

For example, a book on *Samurai* training states: "Those who are *Samurais* shall be attentive to *Giri*, with little acquisitiveness....."⁴¹ Thus in the Tokugawa period the acquisitiveness of a merchant is often compared with *Giri* of a *Samurai*. To the merchants themselves, however, the acquisitiveness was not at all considered to be immoral. On the contrary, Nishikawa Joken, a famous merchantthinker of the Tokugawa period, definitely says, "When a merchant sticks to *Na* (name, honor), neglecting acquisitiveness, it means the discipation of his fortune."⁴² Here he turns down the word (*Na*) which in this case means *Giri* to his family name.

What is more commonplace, contrary to *Giri*, is "*Ninjo*," (human feeling).

Ninjo is often suppressed by *Giri*, giving a characteristic shade on the psychology of the Japanese. They have such an expression as "*Giri-Ninjo* a special product of Japan."

In fact the Japanese tragedies exist in a dilemma where the people have been confronted by these two conflicting motives, i.e., *Giri* and *Ninjo*. Contemporary Japanese still like these tragic stories of conflict, weeping and sympathizing with the characters in the stories.

Let us take up an example in *Rohkyoku*, a kind of story-telling, with an intermixture of recitatives in a peculiar voice. Because of *Giri* to the public, the mother of a good-for-nothing fellow suffers herself from her affection as a mother when she is about to welcome her son who has come back home:

"Inside the shutter

Being unable to meet her son face to face,

The mother, now listening to her son's voice,

Burns her emotion voicelessly like a light-worm,

Which pierces the hearts more than the songs of cicadas.

This is the shackles of convention.

Bearing her pain firmly inside herself."

In such a manner, the mother, being in a fix, even bears her sufferings in order to obey the shackles of convention, which certainly is *Giri*. Moreover, *Giri* and *Ninjo* serve for each other, in a sense that the more suppressed the outlet of *Ninjo* by *Giri*, the purer and stronger *Ninjo* becomes. In Japan, there are many themes in the popular songs which deal with this sort of conflict in their human relations.

"If it is a true love

to bear tears and give up mother's name,

I'll sing a lullaby with all my heart,

cherishing the memory of my childhood."

⁴¹ Bushi Kun (Instructions for Samurai), 1715.

⁴² Nishikawa, Joken; *Cho Nin* Bukuro (Essays on Merchants), 1719.

As to the themes of movies, many of the so-called "Mother story" and "Tear stories" deal with the tragic dilemma between *Giri* and mother's love. Even today movies of this kind appeal to female fans, getting a tremendous profit out of their performance. Thus the "Mother" and "Tear" stories are a barometer to show concretely how many of such conflict in the human relations still exists in the contemporary Japan.

Against such a fetter of *Giri* and *Ninjo*, lie both the naturalism which denies *Giri* and *Ninjo*, emancipating the humanity from the bond of duty, and the rationalism which tries to form a new human relations instead of those of *Giri* and *Ninjo*.

The naturalism which renounces *Giri*, has something to do with *Niku-tai* (body)-ism which ranks high the physical desire. Standing on this point, there are a few arguments which strongly negate the feudalistic human relation in the post-war Japan.

As to the attempt to rationalize and modernize the human relations in Japan, it is necessary, to abolish the overemphasis on *Giri* and resulting conflict between *Giri* and *Ninjo*. Although the rationalization of living, when in the proper direction, would serve this purpose, the rationalization in Japan is apt to fall into the trap of egoism which may be very offensive to other people.

An extreme form of rationalism denying *Giri* and *Ninjo* after the war is the contract-ism which was proped and practised by a young businessman, called Yamazaki who committed suicide after bankruptcy. Yamazaki tried to deal with all human relations through contract. According to Yamazaki, human relations should be controlled by the basic principle of the international law that an agreement shall be observed. Both love and marriage are but contracts. "The reason why one should obey his parents," says he, "is that he owes much of his living to them. Therefore, in compensation for the "salary given by parents obedience to parents is required."

The *contract-ism* in a more natural form can be seen in a developed capitalist society like America. For example, when parents send their children on an errand, the reward for it is decided beforehand. This way of doing is just like contract. This appears, however, to most of the Japanese somewhat destroying *Giri* and *Ninjo* between parents and children. So strongly opposed by the conventional *Giri* and *Ninjo* in the Japanese society, the *contract-ism* sometimes goes to its extreme as a violent reaction to it, resulting in the utter denial of ordinary human relations.

Yamazaki, when he could no longer cover his debts, applied the legal principle of change in circumstances that "the contract should not be applied to a substance of the dead." Transforming himself to a substance, he protected his theoretical consistency. Thus the end of the *contract-ism* was death. He not only resisted against the old-fashioned *Giri* and *Ninjo*, he also renounced human love and confidence altogether.

The principle of *contract*-ism may be repulsive to many Japanese, although its moderate form is an inevitable step towards the rationalization of living.

While *Giri* is an agreement concerning the relations among people or public, "*Hombun*" (proper duty) indicates both the situation in which one stands in his social group, and the forms of social behavior suitable to his social situation.

Hombun originates from the human relations as a status of the feudalistic society. This old element mingles with modern human relations in the contemporary Japan.

Hombun has an analogy to social status, fettering one's life night and day both in time and place. If he is a student, his duty as a student demands him to behave like a student even after classes.

"The Instruction for Service" issued by one of the biggest department-stores in Tokyo, advises the employees: "Every improper conduct of the employees even outside this store will be taken as a fault on the side of our company. In your private life also, mind your P's and Q's, and refrain from such action as will reflect on your store."

If such is the case in an private enterprise, how much more should be with public office? With the "Civil Service Act," their *Hombun* is under a lawful fetter, being restricted in the political actions when off duty.

In a word, to most of the Japanese, it is difficult to draw a line between public and private matters. In some extreme cases, the public life dissipates the whole private life.

The Japanese not only mix the public and private matters out of self-interest, but have had these two go to rack and ruin the very human relation called *Hombun*. To insist upon drawing a line between them is beyond reasonable request to them. Such degenerations as bribery, disgraceful act, favoritism, and perquisite naturally spring forth.

It is obvious that there are unlimited chances to do vile acts, where such feudalistic relations of social status are brought into the modern society based on the capitalistic economy.

In the ideal modern society, the power and the responsibility always come hand in hand. In the Japanese society, however, in the case of public officials which may be the best example, the balance between power and responsibility is completely off, with the former far outweighing the latter.

A public official frankly confesses that in the Japanese public administration "there are detailed regulations as to powers, while there hardly exist any rule as to how much responsibility should be taken when one with power fails in his work."⁴³

Moreover, for the Japanese public officials, the power is not necessarily

⁴³ Imai, Kazuo, *Kanryo* (The Bureaucrat), 1953.

limited within what is required to carry on his assigned work. These always comes along "perquisite." This perquisite comes directly out of the confusion of the public and private matters.

Suppose a policeman is treated to a good meal at a restaurant, taking advantage of his authority. This is a "forced entertainment" making use of his *Hombun* as a policemen, which no informed citizen has courage enough to protest.

After all, the ability of a public official may well be said the ability to evade his responsibility. For example, a boss will say, "It is left in the subordinate's hands," while the subordinate will evade responsibility by saying, "We are waiting for our boss's decision." Quite usually they will wait until the people get tired and give up the matter, being exhausted by such a petty manoeuvring by the bureaucrats.

This type of evasion of responsibility originates not only in cunningness or selfishness, but also in the lack of self-confidence or integrity, a characteristic psychology of many Japanese which has come out of the human relations of her old feudalistic society. Therefore, such an evasion of responsibility is found quite often not only in public officials, but also among citizens.

As seen above, the human relations of the Japanese are haunted by *Giri-Ninjo*, and the individual is bothered with *Hombun*, a sort of product of *Giri-Ninjo*. It seems that all that are vague and unreasonable in the life of the Japanese come out of such an obscure social-psychological atmosphere as *Giri-Ninjo* or *Hombun* which permeate their human relations.

If we wish to build a new Japan, it is urgently needed to reform the basis of her society, and moreover, to attempt to wipe off completely such obscure human relations and the distorted social psychology that generates from them.

The happiness of an individual can only be attained when the social reform is pushed through, parallel to the reform of the individual.

MATHEMATICAL ANALYSIS OF THE METABOLISM AND ANALOGY OF ECONOMICS

By MOTOYOSI SUGITA

Professor of Physics

A thermodynamical analysis of the metabolism of matter and energy shows the resemblance of the mathematical form to that of economics. Therefore, the application of the mathematical method of economics to bio-physics is tried in the following. Further, there is the metabolic turnover of molecules and the turnover of cells which corresponds to the depreciation and repair of economics. Our body resembles a chemical plant or apparatus made of protein molecules and cells, which corresponds to the means of production. In this report the idea of metabolic turnover of the "negative entropy" is introduced.

Social economics might be seen as the highly extended form of the metabolism of free energy, because our labour is part of the output of the free energy and rewarded by the input of the means of consumption, which is necessary to maintain life. Therefore, the analogy seems to be a fundamental one. The idea of the "utility" of food is introduced too and, using the idea, the way of a quantitative analysis of the nutritive value is suggested.

I. Introduction

The analogy of economics and metabolism is rather old. Further, the progress of analysis in both fields revealed the close analogy, especially in the mathematical treatment. The writer of this paper has been trying a mathematical analysis of metabolism on the basis of thermodynamics⁽¹⁾⁽²⁾ and found that the method of the mathematical analysis of economics can be applied to the study of metabolism.⁽³⁾

On the other hand, the study of mathematical biology should give us a model on which to extend the mathematical analysis of economics, although the social phenomena may be too complicated to be treated merely on such model. Nevertheless, we must rely upon some suitable model and the study of the living organism will supply useful suggestion in this respect.

Further, the analogy may not be only superficial but substantial and very important from the *methodological point of view*,⁽³⁾ because labour means output of F. E. (free energy) of our body. The balance of payment and income in economic life may correspond to the balance of F. E., i. e. we obtain food at the cost of output of F. E. and supply F. E. by taking food

(see Fig. 1.). Therefore, *economic life may be considered a highly extended form of the metabolic turnover of F. E.*

In this paper the mathematical analysis of metabolism is described and the application of the mathematical method of economics to bio-physics suggested. Then the substantial relation between metabolism and economics will be discussed from the methodological point of view.

II. The Phenomena of Life and its Analogy to Social Economy

Let us first look at the resemblance of both phenomena.⁽³⁾

(i) Our body consumes various organic and inorganic substances, some of which are produced in our body, like hormone, enzymes, protein, nuclear acid, fats and others, and some of which are taken from the external world by the work of our muscles and digestive organs, like inorganic salt, vitamins, amino acids and others.

(ii) These substances are useful⁽⁴⁾ to maintain life. The idea of nutritive value is well known but *quantitatively* the value of *caloric units* is mainly taken into account. The nutritive value of vitamins, iron and other inorganic substances and some amino acids is also taken into account but only *qualitatively*. There may exist the idea corresponding to *utility* or *welfare function* in economics which may be treated *analytically* and *quantitatively*.

(iii) There is consumption of F. E. to produce or absorb the necessary substances and consumption is *repaired* by production and intake. Even the absorption of glucose, which is the last stage of digested starch, is carried out by the "investment" of F. E. of ATP, an ester of phosphoric acid of high energy. Therefore, in the case of famine or when ill-fed, our organ loses the power to digest or absorb nutritious substances due to the lack of F. E., which corresponds to initial cost. On the contrary, the function of intestinal absorption will be dangerously damaged if over-fed.

The above is shown in Fig. 1., in which the energy is fed back to take the chemical energy from the external world.⁽⁴⁾⁽⁵⁾ This "feeding back" is similar to business life, in which an enterprise is sometimes suppressed by the lack of the initial cost. Indeed our body corresponds to a factory and ATP to capital.

(iv) There is the balance of the need and the supply. Superfluous protein, for instance, loses its amino-group and changes into carbon-hydrates correspond-

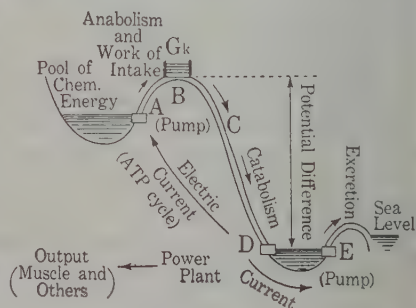


Fig. 1

ing to *consumer's goods*. On the other hand, the protein of our tissues, which corresponds to *producer's goods*, is destroyed by lack of protein, and the material is used to construct the other necessary part.

According to Professor Kida the relatively short legs of the Japanese are due to the lack of protein of high quality in food during growth. The body seems to lack protein to build legs, for we must use the material to construct the necessary part of our organs. Medical science may be considered good management in the balance of matter and F. E.

(v) Our body corresponds to our system of industry. Various substances are produced in every part of our body and supplied to other parts. On the other hand, the parts are also supplied from other parts. There is an *exchange* and *economy* of matter and energy. For instance, the production of protein corresponds to the *first department* of producer's goods. In this case as well ATP as protein is consumed. The consumption of the latter corresponds to the *depreciation* of producer's goods, in this case the chemical apparatus made of protein.

The ATP which is consumed, is *reproduced* again in our body and carbon-hydrates, protein and ATP are consumed for reproduction. Here, the carbon-hydrates correspond to consumer's goods and the reproduction of ATP to the *second department* of economics. Therefore, there is a close analogy between the two fields. For instance, labour is reproduced by the consumption of goods, just as carbon-hydrates in food.⁽²⁾ This fact is important from the point of view of methodology (see Fig. 6).

On the other hand the consumption of protein which is an example of "catabolism," corresponds to depreciation which is repaired by "anabolism."

(vi) *Depreciation* and the *repair* is the general aspect of life. For instance, reproduction is the *turnover* of the body itself, which depreciates during life, especially by reproduction itself.

If we take, however, the history of man-kind into account, depreciation in the individual body is repaired by other bodies. Therefore, those who enjoy youth enjoy the *turnover of the individual body*.

Therefore, one of the most prominent aspects of life is the turnover of molecules, of cells and of the individual body, so that the world of the living organism is repaired and *steadily maintained*. This is very important from the point of view of thermodynamics, for the F. E. on earth is constantly consumed by organisms.

The *steadiness* is similar to that of the river, which consumes the potential energy of water and also maintains steadiness on the "balance" of water.

In a similar manner the depreciation of the apparatus of a chemical plant, the value of N. E. (negative entropy) of our body is also depreciated

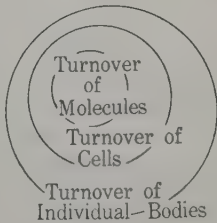
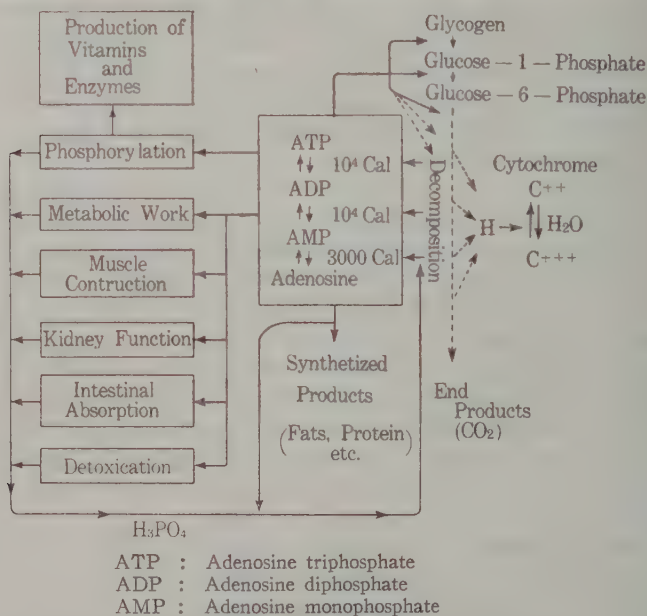


Fig. 2

(see VI). On the other hand this value of N. E. regulates the value of *F.E. of activation* of bio-chemical reactions. Therefore, the "catalytic action" of the organs, corresponding to the function of the chemical plant, is also depreciated and repaired. In this respect the writer has introduced the idea of the *metabolic turnover of N.E.*, corresponding to the depreciation and the repair of producer's goods in economics.⁽³⁾⁽⁵⁾⁽⁶⁾

(vii) Besides the "feed back" of F. E., there is the *circulation of matter* in our body, for instance the *chemical cycle* of $\text{ATP} \rightleftharpoons \text{ADP}$ or the reduction and oxidation of enzymes. Fig. 3 shows the circulation of phosphates of adenosin in which ATP is included. The circulation is very



ATP : Adenosine triphosphate
 ADP : Adenosine diphosphate
 AMP : Adenosine monophosphate
 According to V. R. Potter, Biological Energy Transformations
 and Cancer Problems (Advances in Enzymology 4,201-256,1944)

Fig. 3

complicated, in general, but is schematized in Fig. 4. This is similar to the circulation of paper money in our society. In a similar manner, the matter of high energy is taken from the external world and excreted, so that our body corresponds to a pipe and is called an *open system*. But it is not an open system like the pipe through which the water of a tank flows. This is shown in Fig. 1. The circulation of matter in our body is also similar to the "feed back" of energy, so that the system is half open and half closed.

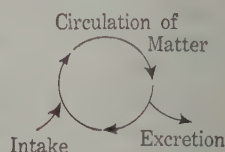


Fig. 4

(viii) The "feed back" of matter and energy is very similar to the management of our social life. Chemical processes in our body are combined like the system of gears (see VI), and, if we wish to promote a process, the effect is fed back and produces sometimes unexpected results. Here is the difference of the bio-chemical change from that in vitro. Therefore, if the knowledge of chemistry in vitro is applied mechanically the effect may be contrary to expectation, as in the controlled social economy.

There is *bad circulation* in our body. For instance, the appetite is diminished, if health is destroyed, and health is disturbed if the appetite is diminished. *Good management* by the physician will eliminate bad circulation.

(ix) There is the balance and stability of matter and F. E. in our metabolism. If the balance is disturbed, the function of our body is disturbed. We have seen that our body resembled a pipe, through which the matter of high chemical energy flows and the matter of low chemical energy is excreted. The balance seems to be favourable to the flow of matter (see Fig. 11). In social life the balance of production and consumption is favourable to the movement of goods. There is the recovering action in our body as well as in our society. If the balance is disturbed, and cannot be recovered, a catastrophe occurs and finally death of our body.

Prof. Bertalanffy called the balance of our body *dynamic stability* or *equilibrium*. From the point of view of thermodynamics, this is not "thermal equilibrium." But stability can be seen in many transient phenomena of the *inanimate world*.⁽¹⁾⁽²⁾ I have studied such phenomena from the point of view of molecular statistics and noticed the stable equilibrium of the "second coordinate" which will be discussed later (see VI) in connection with the maximum principle.⁽³⁾

III. *Metabolism of Matter*⁽³⁾⁽⁴⁾

(i) There is the metabolic turnover of the chemical substances, as shown in fig. 4. Recently radioactive isotopes are used to study the turnover of matter in our body. For instance, organic compounds containing C^{14} or P^{32} are synthesized and introduced into a living body and the movement of these compounds is traced. The isotopes are synthesized to compounds of high energy by anabolism and then destroyed by catabolism.

Now let us take the behavior of a chemical element X , which is not necessarily a radioactive isotope, and let the notation i be a state of the element in our body, may be, for instance, a chemical combination like amino acid, protein as well as a biological one like cytoplasm or nucleoprotein. Let the quantity of the element X in the state i be $n_i(X)$ and the rate of change of X from j to i be $Q_{ji}(X)$, when the *chemical potential* of j , which will be defined afterwards, is *lower* than that of i , and is called

the rate of anabolism from j to i . When the chemical potential of i is higher than that of k , the reaction from i to k is called the catabolism and the rate of this reaction is $q_{ik}(X)$.

The phenomena of life may be represented by the net-work (see Fig. 5) of the chemical rates $Q_{ji}(X)$ and $q_{ik}(X)$, in which the diffusion of a component or absorption through the membrane is included. The reactions $Q_{ji}(X)$ or $q_{ik}(X)$, are not changeable independently but are combined like the gear of a machine, which is the characteristic feature of life and will be discussed later (see VI).

Let $\dot{n}_i(X)$ be the timely rate of the change of $n_i(X)$, then

$$\dot{n}_i(X) = \sum_j Q_{ji}(X) - \sum_l Q_{il}(X) - \sum_k q_{ik}(X) + \sum_m q_{mi}(X) \quad (3.1)$$

If we sum up both sides of (3.1) with respect to i , then $\sum_i \dot{n}_i(X)$ is the rate of change of the total quantity of X in the living body. On the right side, the circulation of matter in the same body is cancelled and the rate of uptake and excretion will remain in the formula, because the living organism is an open system. If the rate of uptake of X is $Q_{ai}(X)$, where the notation a means the external world, and i means the absorbed state; and the rate of excretion of X be $q_{ak}(X)$, where k means the state of X before the excretion, then

$$\dot{M}(X) = \sum_i \dot{n}_i(X) = \sum Q_{ai}(X) - \sum q_{ka}(X) \quad (3.2)$$

The first term of the right side, $Q_{ai}(X)$, corresponds to the import of the material X , for instance, and i specifies the state of the materials. It is analogous to the social economy, for instance, iron is imported in the state of an auto, a typewriter or other machine and instrument. The production of iron in the same country can also be included, for the underground material corresponds to the external world of the living organism. The second term of the right side of (3.2) corresponds to export and $\dot{M}(X)$ corresponds to the total increase of iron in the country.

If we take the summation of $\dot{M}(X)$ with respect to X , then the rate of increase of the total weight of the organism is

$$\dot{W} = \sum_X \dot{M}(X) = \sum_{X ai} Q_{ai}(X) - \sum_{X ka} q_{ka}(X). \quad (3.3)$$

In many experiments of biology \dot{W} is observed, as is well known.

(ii) Let us consider the experiment of the tracer with radioactive isotopes. $\alpha_i(X)$ is the percentage of the isotope in the state i . Then $n_i(X)\alpha_i(X)$ is the quantity of the isotope in the state i and $Q_{ji}(X)\alpha_j(X)$ is the

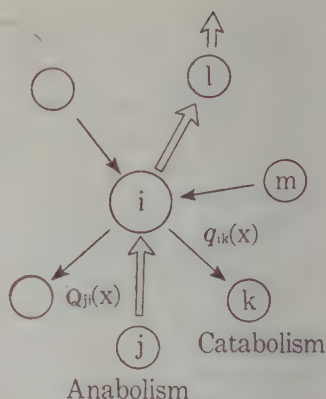


Fig. 5

rate of supply of isotope from j state. Then we obtain

$$\frac{d}{dt}\left(n_i(X)\alpha_i(X)\right)=\sum_j Q_{ji}(X)\alpha_j(X)-\sum_l Q_{il}(X)\alpha_i(X)-\sum_k q_{ik}(X)\alpha_i(X)+\sum_m q_{mi}(X)\alpha_m(X) \tag{3.4}$$

In the steady state $\dot{n}_i(X)=0$, so that

$$n_i(X)\alpha_i(X)=\sum_j Q_{ji}(X)\alpha_j(X)-\sum_l Q_{il}(X)\alpha_i(X)-\sum_k q_{ik}(X)\alpha_i(X)+\sum_m q_{mi}(X)\alpha_m(X) \tag{3.5}$$

These equations can be solved in the form of

$$\alpha_i(X)=\sum A_{in}(X)e^{-\lambda_n(X)t} \tag{3.6}$$

and $\lambda_n(X)$ expressed by $Q_{ji}(X)$, $n_i(X)$ and $q_{ik}(X)$. Therefore, we obtain the detailed knowledge of $Q_{ji}(X)$, $n_{ik}(X)$, if we get the exact knowledge of $\lambda_n(X)$ s.

This is only a preliminary report and a detailed analysis will be given in a following report.

(iii) The system of the net-work of Fig. 5 is too generalized and complicated and should be simplified. We first take a model of bio-chemical reactions which is most suitable. But this will be discussed in the following

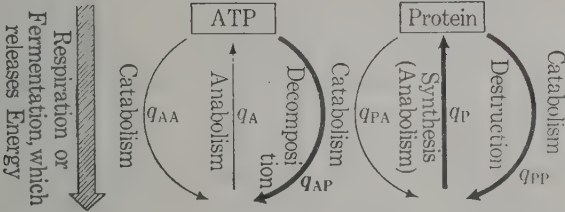


Fig. 6

report. Let us now take a simple model ⁽²⁾⁽³⁾ into account, in which A_i of Fig. 7 corresponds to goods, and glucose to consumer's goods and protein, nuclear acid and other macro-molecules correspond to producer's goods. Fig. 6 shows the relation of the two departments. In department 1, glucose, etc. are produced from carbon-hydrates, and are decomposed by the action of ATP. In these reactions the protein and other macro-molecules are used as producer's goods and depreciated. The depreciation corresponds to the catabolism of those macro-molecules in our cells and tissues. The destruction by catabolism is repaired by the synthesis of anabolism which corresponds to department 1 in economics. In this reconstruction ATP is also required, which corresponds to *labour*. Therefore, the cycle of $ATP \rightleftharpoons ADP$ corresponds to the reproduction of labour and ADP to the state of labourer after work and ATP to the state of saturation after sleeping. Protein and other macro-molecules are also used as producer's goods in this reconstruction, thus the metabolic turnover may correspond to the depreciation and the repair of the productive goods.

If q_{PA} and q_{TA} be the *mean rates* of catabolism of the macro-molecules during the reconstruction of the macro-molecules themselves and of ATP respectively and q_{AA} and q_{AP} the rate of change, $ATP \rightarrow ADP$, during the reproduction of ATP, which is combined with the decomposition of glucose, etc., and the synthesis of the macro-molecules respectively, then we have

$$\left. \begin{aligned} \dot{n}_A &= q_A - q_{AA} - q_{AP} \\ \dot{n}_P &= q_P - q_{PA} - q_{PP} \end{aligned} \right\} \quad (3.7)$$

where n_A and n_P is the quantity of ATP and the macro-molecules and q_A and q_P is the rate of reproduction (see Fig. 6). So that the steady state, i. e. $\dot{n}_A = 0$, $\dot{n}_P = 0$, corresponds to the *simple reproduction*⁽²⁾ of economics and

$$\dot{n}_A > 0, \dot{n}_P > 0$$

to the *expanding reproduction* (see VIII).

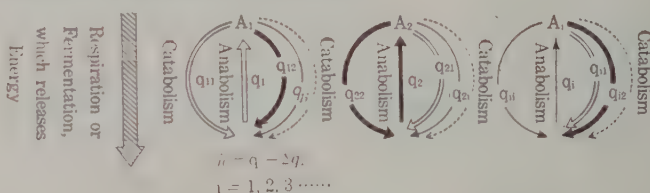


Fig. 7

We can generalize the model⁽³⁾ to the coupling of many departments (see fig. 7).

(iv) *Chemical Cycle*. In the steady state

$$\dot{n}_i(X) = \sum_j Q_{ji}(X) - \sum_l Q_{il}(X) - \sum_k q_{ik}(X) + \sum_m q_{mi}(X) = 0 \quad (3.8)$$

from (3.1). This equation means the *circulation* or the *cycle* of substances in the living organism. There are many types of such circulation, for instance, that of citric acid. Of course, matter is not conserved completely but is supplied and excreted (see Fig. 4). However, catabolism is repaired by anabolism and the *balance* of consumption and production is maintained. Therefore, circulation is kept in a *steady state*. Strictly speaking, the steady state in the living organism is in question, but the balance like the equation (3.8) is maintained in a short time in the living organism, although the organism may be fertile and decay in the long run.

When the organism is not in a steady state, the cycle changes and a *expanding* or *contracting* reproduction may be seen, according to external conditions. Therefore the living organism has self-movement and does not simply follow external action, because the chemical rates, $Q_{ji}(X)$ or $q_{ik}(X)$, are connecting and make a "feed back system." The living organism is called a *self-maintaining system* and this character may be due to the nature of the "chemical cycle."

A top has a self-movement too, and does not simply follow the external

action. It is rotating on its axis and the rotation may correspond to the chemical cycle in the living organism.

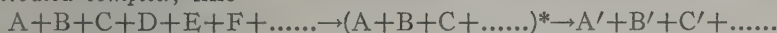
There is the circulation of goods or commodities in our society, and this is also self-movement.

(v) What is the nature of the *coupling* of the chemical rates? These reactions are combined in *series* by the relation of supply and consumption.

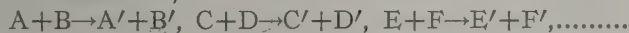
(a) Therefore, the chemical rate is controlled by the law of supply, like the law of mass action, or by Fick's law of diffusion. In general, the rate of reaction and diffusion is determined by the *field of ch.p.* (chemical potential) introduced by the author⁽¹⁾⁽²⁾ in the living organism. The field is dependent on supply and consumption.

(b) On the other hand chemical reactions are combined in *parallel*, for instance, *endergonic* reaction, which absorbs energy, is combined with *exergonic* reaction, which releases energy, and then the former, which seems to be the *reversed course* from the thermodynamic point of view, is realized or maintained (see VI). The oxidation of fatty acids and the composition or decomposition of some amino acids is combined with the cycle of citric acid. The destruction of protein which corresponds to the depreciation of productive goods, is also combined with the reconstruction, for which the protein might be considered to play the role of the chemical apparatus.

These combined reactions may be due to the formation of the common *activated complex*, like



Therefore the reactions,



are realized, some of which can not be realized independently.

(c) The activity of enzymes is controlled by the production of some substances, like the change of PH value or the stypic action of trombogen when the skin is wounded. The *fitness* of our body may be realized by such controlling action.⁽²⁾

IV. Metabolism of F. E. (free energy)

There is a *balance* of energy in our body, but it is more convenient to take F. E. into account in the case of the living organism, as there is a loss or dissipation of F. E. in the organism. The idea of F. E. contains the "utility" of energy (see the definition of (8.5)). There is no *loss of energy* itself. But the utility of the energy is depreciated. The depreciation is described by a change of F. E. of the living organism. The definition of F. E. will be given later. It may be mentioned here that the so-called *chemical energy* is not pure energy but F. E.

In III combined reaction is considered, in which F. E. released by

exergonic reaction is transferred to endergonic reaction. In the transfer, the ATP cycle plays an important role. For instance, the released F. E. is transferred to reaction $\text{ADP} \rightarrow \text{ATP}$, then the reaction $\text{ATP} \rightarrow \text{ADP}$ is coupled with the endergonic reaction (see Figs. 8 and 9). In this case the action of ATP is similar to the electric power of Fig. 1, and endergonic reaction is promoted by pump action.

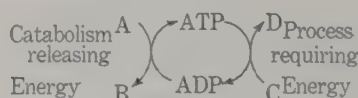


Fig. 8

Let us consider the balance of F. E. in our body.⁽⁴⁾⁽⁵⁾ In Fig. 10, Z_1 is the uptake of the F. E. and Z_2 is the one excreted. Then $Z_1 - Z_2$ is utilized by the organism to maintain life. Let G_k be the F. E. of the organism, then

$$Z_1 - Z_2 = \dot{G}_k + D, \quad (4.1)$$

where D is the F. E. consumed by the organism. We can spell (4.1) in the form

$$\dot{G}_k = Z_1 - Z_2 - D \quad (4.2)$$

$Z_1 - Z_2$ means F. E. of the external world which is consumed by the organism. If we consider the rate of decrease of F. E. of the external world, $-\dot{G}_a$, then

$$-\dot{G}_a = Z_1 - Z_2. \quad (4.3)$$

Therefore,

$$\dot{G}_a + \dot{G}_k = -D < 0.$$

That is, the F. E. of the total system, i. e. the organism and the external world, decreases thermodynamically. D may be a positive definite but verification might be a matter of future, by extending the H-theorem of Boltzmann (see VI).

(4.4) shows the decrease of F. E. of the total system but the increase of G_k , if the organism is in growth. Growth may promote, however, the decrease of $G_a + G_k$ of the total system. This is very interesting from point of view of the maximum principle of VI. The fact, that \dot{G}_k growth, corresponds to the accumulation of capital in economics.⁽³⁾

Therefore, (4.4) shows that there is "no difficulty in applying thermodynamics" to the living organism.⁽²⁾

Let us now take the steady state into consideration. Then $\dot{G}_a = 0$.

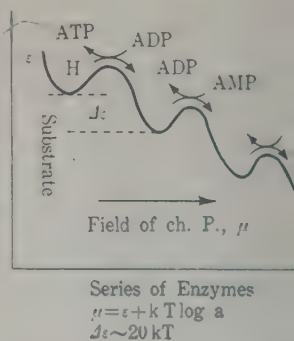


Fig. 9 Potential curve of the series of enzymes

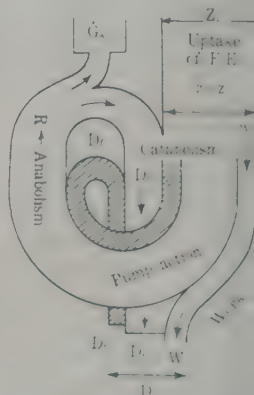


Fig. 10 Balance of F

$$-\dot{G}_a = Z_1 - Z_2 = D \quad (4.5)$$

(4.1) and (4.3).

Let us consider the balance in detail. A part of F. E., $Z_1 - Z_2$, is used for the work of muscles or of digestion, of absorption and of excretion. Let us denote this by W . The other part is used as pump action to promote catabolic reaction or anabolism. The F. E. of our body is reproduced by pump action. Let us denote the rate of reproduction by R . There is a loss of F. E. during the work, W , and during the pump action, R , and this is denoted by D_i . The relation of these quantities is expressed by Fig. 10. Then

$$\left. \begin{aligned} Z_1 - Z_2 &= W + R + D_i, \\ R &= Z_1 - Z_2 - W - D_i, \end{aligned} \right\} \quad (4.6)$$

we obtain from (4.2) and (4.6)

$$\dot{G} = W + R + D_i - D.$$

Let us introduce the following relation

$$\left. \begin{aligned} D_i &= D - W - D_r, \\ D &= W + D_i + D_r, \end{aligned} \right\} \quad (4.7)$$

$$\dot{G}_k = R - D_r \quad (4.8)$$

is the fundamental equation of the thermodynamics of metabolism.⁽³⁾⁽⁵⁾ It is expressed by Fig. 10 and D_r is the dissipation of F. E. due to catabolism.

Our life is maintained by consuming the compounds of higher chemical energy, which is partly supplied from the external world, $Z_1 - Z_2$, and partly reconstructed by pump action, R . If part of the consumption, D_r , is not compensated by reproduction, R , the organism will be in a *steady state*, $\dot{G}_k = 0$.

$$R = D_r \quad (4.5')$$

If $R > D_r$, the difference of F. E., $R - D_r$, is stored in the organism.

V. Detailed Analysis

The writer has introduced the following relation to F. E. of the organism.⁽⁴⁾⁽⁵⁾

$$\dot{G}_k = \sum_{\mathbf{x}} \sum_i v(\mathbf{X}) \dot{n}_i(\mathbf{X}) \quad (5.1)$$

where $v(\mathbf{X})$ is the chemical potential of molecular statistics, where

$$v_i(\mathbf{X}) = \frac{\partial G}{\partial n_i(\mathbf{X})} \quad (5.2)$$

is the chemical potential of \mathbf{X} in the state i (see note 1). This definition is analogous to that of the *marginal utility* but the analogy is not complete as shown later (see VI).

Note 1. For instance, the ch. p., $v_1(\text{C})$ of carbon of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, is

different for every carbon atom. Therefore the total value of the ch. p. of glucose is

$$v = \sum_i v_i(C) + \sum_j v_j(O) + \sum_k v_k(H),$$

where i, j, k specifies the state of the chemical combination of each C, O, H respectively.

If we take (3.1) into account, then

$$\begin{aligned} \dot{G}_k &= \sum_{x \ i} \sum v_i(X) \{ \sum_j Q_{ji}(X) - \sum_l Q_{il}(X) - \sum_k q_{ik}(X) + \sum_m q_{mi}(X) \} \\ &= \sum_{x \ ij} \{ \sum (v_i(X) - v_j(X)) Q_{ji}(X) - \sum_{ik} (v_i(X) - v_k(X)) q_{ik}(X) \} + Z_1 - Z_2, \end{aligned} \quad (5.3)$$

where

$$\left. \begin{aligned} Z_1 &= \sum_{x \ ai} \sum v_i(X) Q_{ai}(X), \\ Z_2 &= \sum_{x \ ka} \sum v_k(X) q_{ka}(X). \end{aligned} \right\} \quad (5.4)$$

The meaning of $Q_{ai}(X)$ and $q_{ka}(X)$ is given by (3.2). Therefore, Z_1 is the uptake of F. E. from the external world, i. e. the F. E. of food and air, and Z_2 is the F. E. which is excreted. Let us write

$$D = - \sum_{x \ ij} \sum (v_i(X) - v_j(X)) Q_{ji}(X) + \sum_{x \ ik} \sum (v_i(X) - v_k(X)) q_{ik}(X). \quad (5.5)$$

Then we obtain the equation (4.2)

$$\dot{G}_k = Z_1 - Z_2 - D, \quad (4.2)$$

where D is the total consumption of the F. E. to maintain life. (4.2) is analogous to the equilibrium of economic life and $Z_1 - Z_2$, D and \dot{G}_k corresponds to *national income*, to *consumptions* and to *stocks* respectively.

The first term of (5.5) corresponds to R , so that

$$R = \sum_{x \ ij} \sum (v_i(X) - v_j(X)) Q_{ji}(X) \quad (5.6)$$

and the second term of D is

$$\sum_{x \ ik} \sum (v_i(X) - v_k(X)) q_{ik}(X) = D + R = W + D_r + D_f + R \quad (5.7)$$

from (5.6) and (4.7). Considering (4.7), let us define

$$\begin{aligned} \sum'_{x \ ik} \sum (v_i(X) - v_k(X)) q_{ik}(X) &= \\ \sum_{x \ ik} \sum (v_i(X) - v_k(X)) q_{ik}(X) - (W + R + D_f) &= D_r. \end{aligned} \quad (5.8)$$

Then we obtain (4.8) again,

$$\dot{G}_k = R - D_r. \quad (4.8)$$

In the steady state, (4.5') can be defined in the form

$$\sum_{x \ ij} \sum (v_i(X) - v_j(X)) Q_{ji}(X) = \sum'_{x \ ik} \sum (v_i(X) - v_k(X)) q_{ik}(X) \quad (5.9)$$

from (5.6) and (5.8). (5.9) shows the net balance of F. E. in our body.

Therefore $Q_{ji}(X)$ corresponds to the flow of goods during production and $q_{ik}(X)$ to that in consumption and they are similar to the quantities in the *activity analysis* of economics. $v_i(X)$ corresponds to the value (not the quantity of labour in this case, but the utility) of goods, and our body uses this value to maintain life. The substances which have lost the value or

utility are excreted. But the definition of (5.2) is rather different from that of economics, because $n_i(X)$ is a thermodynamic quantity. It may, however, be possible to define $v_i(X)$ based on the quantities like $Q_{ji}(X)$ or $q_{ik}(X)$ which are not thermodynamic quantities and correspond to quantities in economics (see VI).

VI. The Maximum Principle⁽⁷⁾

In chemical kinetics the reaction rate usually depends on the difference of the chemical potential of this reaction (see note 2). This is similar to the movement of goods depending on value.

Note 2. In the generalized chemical change $\Sigma A_i \rightarrow \Sigma B_k$, the ch. p. of the system of ΣA_i be v' and that of ΣB_k be v'' . Then the rate of the reaction is proportional ⁽²⁾ to

$$e^{v'/kT} - e^{v''/kT}.$$

If the system is nearly in equilibrium, $v' \doteq v''$ and the rate of reaction is approximately proportional to $v' - v''$, i. e. the difference of the che. p..

In the living organism, however, the chemical reaction is not so simple, because the endergonic reaction is coupled with the exergonic one. Or the anabolism and catabolism is conjugated to each other and their rate of reactions is not independent (see III and IV). This corresponds to the relation of production and consumption of goods, because we consume goods, i. e. iron, oil and electricity, to produce goods.

Let q_1, q_2, \dots, q_s be the parameters specifying the rate of such combined or coupled reactions of III. Then $Q_{ji}(X)$ and $q_{ik}(X)$ is represented in the following way,

$$\left. \begin{aligned} Q_{ji}(X) &= \sum_s A_{jis}(X) q_s \\ q_{ik}(X) &= \sum_s Q_{iks}(X) q_s \end{aligned} \right\} \quad (6.1)$$

Then, from (5.5)

$$\begin{aligned} D &= \sum_s \sum_x \left\{ - \sum_{ij} (v_i(X) - v_j(X)) A_{jis}(X) + \sum_{ik} (v_i(X) - v_k(X)) a_{iks}(X) \right\} q_s \\ &= \sum_s \Delta v_s q_s, \end{aligned} \quad (6.2)$$

where

$$\Delta v_s = \sum_x \left\{ - \sum_{ij} (v_i(X) - v_j(X)) A_{jis}(X) + \sum_{ik} (v_i(X) - v_k(X)) a_{iks}(X) \right\}. \quad (6.3)$$

Here, q_s may be dependent on Δv_s . But the relation is, in general, not so simple (see note 2). There is, however, quasi-equilibrium, which is maintained in the living organism (see note 3) and the linear relation between q_s and Δv_s may be assumed. Then D of (6.2) has the quadratic form with respect to q_s . Therefore D may be a *positive definite* and, if so, the thermodynamic relation (4.4) can be verified.

Note 3. The energy change of each reaction, $i \rightarrow k$ of $j \rightarrow i$, may sometimes be

very large but the energy is transferred to the combined reaction, so that the change of the ch. p. of the combined reaction is not large. Therefore, the relation between Δv_s s and q_s s will be linear and homogeneous. R and D_r is also the homogeneous quadratic function of q_s s.

Indeed many reactions in our body are nearly reversible and almost in equilibrium. There are some stages, which are irreversible. The loss of D_r in (4.6) may be due to such reactions.

Let us consider the steady state and transform R and D_r of (4.8) in the following form

$$\left. \begin{aligned} R &= \sum_s \sum_{ij} A_{jis}(X) (v_i(X) - v_j(X)) q_s = \sum_s \Delta v_s' q_s \\ D_r &= \sum_s \sum_{i'k} a_{iks}(X) (v_i(X) - v_k(X)) q_s = \sum_s \Delta v_s'' q_s \end{aligned} \right\} \quad (6.4)$$

where

$$\left. \begin{aligned} \Delta v_s' &= \sum_x \sum_{ij} A_{jis}(X) (v_i(X) - v_j(X)) \\ \Delta v_s'' &= \sum_x \sum_{i'k} a_{iks}(X) (v_i(X) - v_k(X)) \end{aligned} \right\} \quad (6.5)$$

R and D_r are also assumed to have the quadratic form (see note 3). Then the condition of the steady state, (4.5'), is defined in the form

$$\sum_s \Delta v_s' q_s = \sum_s \Delta v_s'' q_s \quad (6.6)$$

which is equal to the relation (5.9).

Let a small variation be given to q_s s, maintaining the condition of steadiness, (6.6). Then, from the *physical consideration*, $Z_1 - Z_2$ or D of (4.5) will show a maximum at a certain point in q_s -space. Mathematically speaking, D is quadratic and has a minimum, therefore, it is not possible to show that the section of two hyper-surfaces, (6.6) and (4.5), in q_s -space has a maximum. We assume, however, that the living organism consumes F. E. of the external world at a *maximum rate*. Therefore, in the steady state \hat{G}_a of (4.3) is assumed to be a maximum from physical considerations.

Further, there are not only one maximum but many maximum points. Let us take, however, one maximum into consideration. Then the maximum condition is shown from (4.5)

$$\partial(Z_1 - Z_2) = \delta D = 0.$$

If we assume temporarily that W and D_i of (4.7) is constant, then

$$\delta D = \delta(W + D_r + D_i) = \delta D_r = 0. \quad (6.7)$$

On the other hand from (4.5') or (6.6)

$$\delta R = \delta D_r = 0. \quad (6.8)$$

From (6.7) and (6.8) we obtain

$$\delta(R - \lambda D_r) = 0, \quad (6.9)$$

where λ is Lagrange's coefficient.

R and D_r has the quadratic form, so that, from (6.4)

$$\left. \begin{aligned} \delta R &= 2 \sum_s \Delta v_s' \delta q_s \\ \delta D_r &= 2 \sum_s \Delta v_s'' \delta q_s \end{aligned} \right\} \quad (6.10)$$

Therefore from (6.9) and (6.10)

$$\sum_s (\Delta v_s' + \lambda \Delta v_s'') \delta q_s = 0 \quad (6.9')$$

If we take (6.6) into consideration, $\lambda = -1$ and we get

$$\Delta v_s' = \Delta v_s''$$

or
$$\sum_{x \text{ ij}} \sum A_{jis}(X)(v_i(X) - v_j(X)) = \sum_{x \text{ ik}} \sum a_{iks}(X)(v_i(X) - v_k(X)) \quad (6.11)$$

from (6.5). Or multiplying both sides of (6.11) with q_s we obtain

$$\sum_{x \text{ ij}} \sum A_{jis}(X)(v_i(X) - v_j(X))q_s = \sum_{x \text{ ik}} \sum a_{iks}(X)(v_i(X) - v_k(X))q_s. \quad (6.12)$$

This is the equation of the *detailed balance*, which is quite different from that of statistical mechanics, of the metabolic turnover of F. E. (see note 4), and is similar to that of *simple reproduction* in economics. If it is possible to know the values of $A_{jis}(X)$, $a_{iks}(X)$ and q_s , then $v_i(X)$, or $v_k(X)$ can be known. These quantities refer to the *chemical potential of our body in the living state*, which might be obtained, if we were able to observe the rate of bio-chemical changes, $A_{jis}(X)q_s$, $a_{iks}q_s$ in detail. Here, $a_{iks}(X)q_s = q_{iks}(X)$ is the rate of consumption of the compounds containing X, which is used for the production, $j \rightarrow i$, by the process s, and $A_{jis}(X)q_s = Q_{jis}(X)$ is the corresponding rate of production.

Note 4. Summing up both sides of (6.12) with respect to s, we obtain (6.6) or (5.9).

These values of $v_i(X) - v_j(X)$ and others are not those of the meat or the giblets on the market, as was described in the preceding.⁽²⁾ They are quantities corresponding to the function of life. So that we can estimate the *function of life* itself in this manner.

Let us consider again the meaning of the *maximum principle*, which was discussed in the preceding report⁽²⁾⁽⁵⁾⁽⁷⁾ (see Fig. 11). There is no difference in the height of water flowing on both sides of the river, as water tends to equalize the surface.

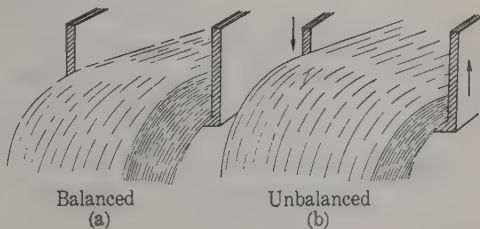


Fig. 11

But there is a difference along the flow, for water must equalize the surface against the resistance of the stream. Let us call the difference or the rate of flow the *first coordinate*, and that, which can be equalized, the *second coordinate*.⁽⁴⁾⁽⁵⁾⁽⁷⁾ In Fig. 11 (b), the second coordinate is not yet *equalized*. Then the surface must be equalized and the state (b) will return to (a). Then the rate of flow, which is the first coordinate, will be the *maximum*, and there is *equilibrium in the second coordinate* though the system is in transient state. This is a very important fact for the study of the transient state.

A living organism is not in thermodynamic equilibrium but the matter is going through the body. Such flow corresponds to the first coordinate.

There is a *balance* or certain *equilibrium* which corresponds to the "second coordinates."

The economics of our social life is also phenomena of consumption and reproduction and a balance or equilibrium is seen which corresponds to the "equilibrium of the second coordinate." There is also a *net flow* of goods which corresponds to the first coordinate. Therefore, there is a fundamental difference between the equilibrium of economics and that of thermodynamics and the analogy of the ordinary theory of thermodynamics seems to be dangerous to the study of economics.

But quantities like $q_{ik}(X)$ or $Q_{ji}(X)$ and D , which are not of a thermodynamic nature (see note 5), have a close correspondence with the quantities in economics. For instance, the definition of v like

$$\frac{\partial D}{\partial q_s} = 2\Delta v_s \quad (6.13)$$

is analogous to the definition of the marginal utility (see VII). (6.13) is easily derived from (6.2), for D is the homogeneous quadratic function of q_s .

Note 5. $Z_1 - Z_2$, R and D is not F. E. itself but its *rate of change*. In the same manner W is not the work generally but the work of a single day. Therefore, the *unit* is not that of energy but energy/time which has the dimension of power. From the point of view of thermodynamics they are "kinetic quantities" and not thermodynamic functions.

VII. Utility in Bio-physics.

It has been mentioned that there may be many maximums in a steady state. These maximums depend on the uptake of F. E. and the steadiness itself is the result of the balance of uptake and consumption, etc.

Let us use the analogy of economics in the analysis of metabolism.⁽³⁾⁽⁴⁾ In economic life, W can be defined by $W_1 + W_2$, where W_1 is physiological, i. e. digestion, absorption and excretion, and W_2 is the "output of labour," which is *rewarded* by income (see Fig. 1.). In order to obtain the *maximum utility* of nutritive substances, we consider at first "income and market price," and then digestion which depends on W_1 . Thus, there is a close relation between the economics of social life and the physiological economics of matter and F. E.

$Z_1 - Z_2$ has *utility* in maintaining life, by allowing the work of reproduction and repair of our body, R , as well as output, W , using the F. E. of $Z_1 - Z_2$. Then

$$\frac{\partial(Z_1 - Z_2)}{\partial q_s} \quad (7.1)$$

may correspond to *marginal utility*. It seems to me that the principal part of utility, U , or marginal utility of goods will be $Z_1 - Z_2$ or the quantity

of (7.1), because the principal utility of goods must be to "maintain life." U may thus be defined in the form

$$U = Z_1 - Z_2 + \sigma \quad (7.2)$$

where σ depends on personal or subjective matter. If we take the analogy with *welfare functions*, it corresponds also to $Z_1 - Z_2$.

Now let us extract the "relation with society" and observe the organism purely biologically.

In (4.6) W corresponds to investment in F. E., $Z_1 - Z_2$, and the latter corresponds to income. The relation between $Z_1 - Z_2$ and W may be described by Fig. 12. Therefore, if W is too large, $R + D_i = Z_1 - Z_2 - W$ becomes smaller and the depreciation of our body cannot be repaired. Then output W as well as intake $Z_1 - Z_2$ becomes smaller. On the other hand, if W is too small, $Z_1 - Z_2$ becomes small. Therefore, there may be an optimum partition between R and W , and then $Z_1 - Z_2$ is the maximum. Then $R + W$ will be also a maximum and D_i a minimum. Therefore (6.12) may be obtained. Details will be described in the following report.

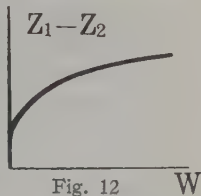


Fig. 12 W

In general, the living organism is not in a steady state, $\dot{G}_k > 0$, when it is growing and recovering, and $\dot{G}_k < 0$, when in senility and in ill health. There is, however, a steady state, if we choose adequately w_1, w_2, \dots , the quality and the quantity of food, then a result similar to (6.12) may be obtained. But there may be many maximums according to the difference of the history of the organism in the experiment.

Details will be given in the following report.

The idea of the utility of nutritive substances is based on an experiment, in which food lacking tryptophane and tryptophane itself is given alternatively at an interval of 12 hours. Tryptophane is one of the essential amino acids. The total quantity of these amino acids is enough but the growth of rats used in the experiment was hindered. We can see from this that the utility of amino acids is diminished in such doses. The effect suggests also a new way of estimating the nutritive value of foods.⁽⁸⁾

VIII. Depreciation and Repair of the Living Organism

Let us take the turnover of F. E. into consideration based on the model of Fig. 6. R of (4.5') can be defined as $R_1 + R_2$, where R_1 and R_2 corresponds to the reproduction of macro-molecules and of ATP respectively. In the same way D_r may be defined as $D_{r1} + D_{r2}$, where D_{r1} and D_{r2} corresponds to the destruction of macro-molecules and to the consumption of carbon-hydrates, for instance, respectively. Then (4.5') will be

$$D_{r1} + D_{r2} = R_1 + R_2 \quad (8.1)$$

D_{r_2} is transferred to ATP and, if we define it as V ,

$$V = D_{r_2} = V_1 + V_2 \quad (8.2)$$

where V_1 and V_2 is used to the reproduction of macro-molecules and of ATP respectively. On the other hand D_{r_1} can be spelled

$$D_{r_1} = C_1 + C_2 \quad (8.3)$$

where C_1 and C_2 is the depreciation of macro-molecules during the reproduction of the macro-molecules themselves and of ATP respectively. Then

$$\begin{aligned} C_1 + V_1 &= C_1 + C_2 = R_1 \\ C_2 + V_2 &= V_1 + V_2 = R_2 \end{aligned} \quad (8.4)$$

This is analogous with simple reproduction in economics⁽²⁾ (see Fig. 6 and the note 6), and in adding both (8.4) and taking (8.2) and (8.3) into account, we again obtain (8.1).

Note 6. The quantity like the *surplus value* will not appear in the living body.

If we consider further the departments in detail, we have the relation of the balance of F. E. of (6.12).

Macro-molecules of the living organism are a chemical apparatus with excellent function due to their *orderliness*. This is specified by the value of F. E. from the view point of thermodynamics. Therefore the depreciation of F. E. of the macromolecules is due to that of the entropy part of F. E., for the F. E. (of Gibbs) is represented by

$$G = \chi - TS = \chi + T(-S) \quad (8.5)$$

where χ is the heat function and $-S$ is N. E., and T the absolute temperature. The heat function or enthalpy is directly related to the *exchange of energy* itself. (8.5) shows that the *utility of the energy* is controlled by $T(-S)$. i. e. by N. E., $(-S)$.

The great value of N. E. in the living organism seems *queer* from the view point of the classical theory of thermodynamics. The value of the N. E. is, however, depreciated in *accordance* with the theory of thermodynamics or molecular statistics. On the other hand, it is reproduced as shown by (4.8). The mystery of life is thus clarified, if the idea of *metabolic turnover of N. E.* is introduced, corresponding to depreciation and repair in economics.

The idea of the *turnover of entropy* is first introduced by the author.⁽⁶⁾ It is also important if we take the problem of fatigue into consideration. Ordinarily the consumption of glycogen, for instance, is taken into account. This, however, is not due to substances corresponding to consumer's goods only, but to the depreciation of N. E. in our body. In a state of fatigue

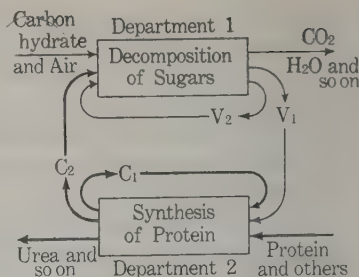


Fig. 13

we consume more energy than in a normal state. This is due to the depreciated function of our body, especially the function of *energy transfer*, as the loss in energy transfer, D_t of (4.6) is increased in such state. The depreciation of N. E. in our body, which corresponds to the chemical apparatus of macro-molecules, is not taken into consideration in the ordinary study of human labour.

IX. Conclusion

In human society, W , of output is rewarded in a complicated manner and there may be a difference in social science and biology at this point (see note 7).

On the other hand, labour is stored in the form of instruments, machines and other means of production. The use of such storage requires technique and skill which is cultivated by training and study. Therefore, these are also a storage of human labour. Therefore we work with these stored instruments, technique and wisdom, and the products of labour are exchanged. Here is the difference between homo sapiens of today and other animals, and this is the reason of the complicated relation of output W_2 , and the reward.

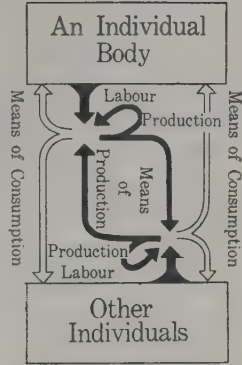


Fig. 14 Exchange of Output of Human F.E. from the Biophysical Point of View.

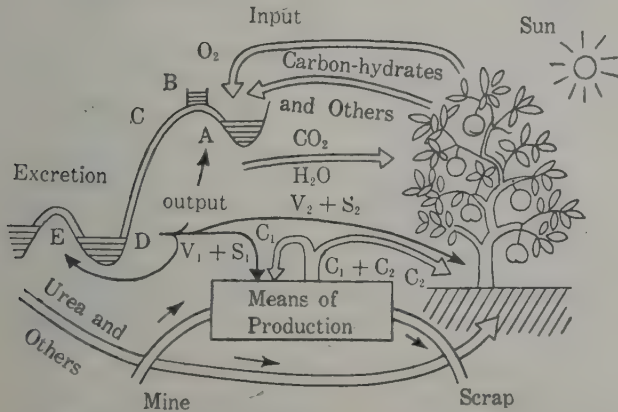


Fig. 15 Circulation of Matter and Free Energy in Nature

But the *fundamental* aspect of the balance of matter and F. E. to maintain life cannot be different in both phenomena. Therefore, the analogy is fundamental from the point of view of methodology.

Note 7. If $W=W_1$, and $W_2=0$, then $R+W_1+D=Z_1-Z_2$ of (4.6) corresponds to the basal metabolism, in which the quantity R is mainly due to the metabolism of entropy part.

The mathematical analysis given in this report is only a preliminary one, and will be extended in the near future.

To Mr. T. Seki, Master of Commerce and Lecturer of this university, the author owes special thanks for his valuable co-operation.

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